Vol. XXXII FEBRUARY, 1922 No. 2

THE LARYNGOSCOPE

AN INTERNATIONAL MONTHLY JOURNAL
DEVOTED TO DISEASES OF THE

EAR - NOSE - THROAT

FOUNDED IN 1896 BY

DR. M. A. GOLDSTEIN, St. Louis,

Managing Editor and Publisher.

For Contents See Page 1.

Subscription, $6.00 per Annum, in Advance.

Foreign Subscription, 35 Shillings per Annum, Post Free.
Single Copies, 75 cents.

PUBLISHED BY THE LARYNGOSCOPE CO.

3858 Westminster Place, St. Louis, Mo., U. S. A.

FOREIGN OFFICE, BAILLIERE, TINDALL & COX,

8 HENRIETTA ST., STRAND, LONDON, ENG.

[Entered at the Postoffice at St. Louis, Mo., as Second-Class Matter, in July, 1896.]

THE

LARYNGOSCOPE.

VOL. XXXII ST. LOUIS, FEBRUARY, 1922. No. 2

ORIGINAL COMMUNICATIONS.

(Original Communications are received with the understanding that they are contributed exclusively to THE LARYNGOSCOPE.)

ANALYSIS OF THE SYSTEMIC AND LOCAL CONDITIONS FOLLOWING TONSILLECTOMY AND ADENOIDOTOMY.*

DR. CORNELIUS G. COAKLEY and DR. EDWARD L. PRATT, New York.

There is no operation in surgery so frequently performed as tonsillectomy and excision of adenoids, concerning which so little "follow up" investigation has been undertaken. It is our purpose to analyze the conditions found in our private patients on whom we operated during the period from January 1, 1908, to July 1, 1920.

We shall first consider briefly the technic employed and discuss the immediate effects and complications. These data are taken from our case records.

We shall then present the conditions later found. For this latter purpose we have chosen to send to each patient a "questionnaire" asking for certain information, with the object of obtaining each patient's view of the value of the operative proceedure. In all cases where the results were not satisfactory, a letter was sent requesting that the patient return for an examination, so that we might determine whether an unfavorable result were attributable to any fault in technic, or whether due to some other local condition. This investigation has been under way for several months, mainly through the efforts of my associate, Dr. E. L. Pratt, and our secretaries. Owing to the great diffidence on the part of some patients to answer the questionnaire or to afford us

*Read before the Section on Rhinology and Laryngology, New York Academy of Medicine, May 19, 1921.

an opportunity of re-examination, our records are not as complete as we desire.

During the above stated period we operated on 926 patients for tonsils and adenoids. The ages of patients varied from six months to sixty-eight years, as noted in Table I.

TABLE I.

Age	Number
Under 1 Year	5
1-2 Years	12
2-3 "	43
3-4 "	47
4-5 "	47
5-6 "	54
6-7 "	36
7-10 "	114
10-15 "	120
15-20 "	83
20-30 "	142
30-40 "	93
40-50 "	38
50-60 "	15
60-68 "	6
Not given	71
Total	926

Of these 794, or 86%, were given a general anesthetic and 132, or 14%, were operated with local anesthesia.

TECHNIC.

The operative technic on the tonsil is identical, whether done under general or local anesthesia. The selection of the anesthetic is mainly a matter of choice on the part of the patient and operator, with the exception that in acute lesions of the kidney and in cases of severe chronic bronchitis and arrested pulmonary tuberculosis, we deem local anesthesia preferable to general.

Suction is employed at all stages of the operation to keep any escaped blood from entering the larynx. The tonsil is seized with forceps, the anterior and posterior pillars are carefully freed from the capsule, a cold wire snare placed around the partially freed tonsil and dissection completed by the closure of the wire loop. Immediately following the excision a rounded gauze sponge on a sponge holder is placed in the fossa to arrest the hemorrhage. At the end of two or three minutes it is removed. Immediately upon removing the sponge, all bleeding points are grasped with an Allis clamp, and if on removing the clamp there is a recurrence of the bleeding, it has been our custom latterly to ligate the bleeding vessel or vessels. Each tonsillar fossa is ascertained to be absolutely dry before proceeding to the excision of the adenoids. Each tonsillar fossa is care-

fully inspected, as are also the enucleated tonsils, to see that no particle of tonsil tissue is left in situ.

While performing the operation we have frequently noted in children discreet lymph nodes in the anterior or in the posterior pillar of the fauces, and sometimes in the velum or soft palate, well anterior to the tonsillar fossa. It is impossible to remove these lymph nodes without removing so much of the anterior or posterior pillars, as the case may be, as to result in a very marked shortening and contraction of the pillars, which is most undesirable. We have watched the course of these lymph nodes, finding them at times to disappear, and at other times to continue to hypertrophy similarly to the lymph nodes that are found on the posterior pharyngeal wall. When they do hypertrophy, owing to the contraction of the scar tissue in the tonsillar fossa, they may sometimes appear as one or more discreet lymph nodules in the tonsillar fossa. I am also convinced that there are in some patients lymph nodes in the connective tissue external to the capsule of the tonsil and in some cases these hypertrophy and may be mistaken for a re-hypertrophy of tonsil tissue. They may be differentiated from a regeneration of tonsil tissue by the absence of the crpyts or lacunae peculiar to tonsil tissue. These lymph nodes are not infrequent in children under five years of age, are rarer in children over five years of age, and are seldom seen in adults.

The amount of hemorrhage in children under six years of age is seldom more than a dram per tonsil, and the average amount of hemorrhage in adults is less than six drams per tonsil. The hemorrhage is usually less when local anesthesia is employed than when a general anesthetic is administered. The percentage of blood lost in adults is not more than that in children when difference in blood volume is considered.

ADENOIDOTOMY.

We have coined this term to indicate the fact that we remove the excessive amount of lymphoid tissue in the naso-pharynx in contradistinction to its complete removal, as would be indicated by the term adenoidectomy.

We find it impossible to remove all traces of lymphoid tissue from the vault and lateral wall of the naso-pharynx, and judging from the results of other operators we find that they are no more successful than we. Owing to the imperfect removal of adenoid tissue it is never possible to state definitely that there may not be a sufficient hypertrophy of the tissue that remains to produce symptoms either referable to obstruction, sepsis, or infection extending through the Eustachian tube to the tympanum.

The instruments used for an adenoidectomy are the LaForce adenotome, followed by Gottstein's curette and the use of punch forceps to excise the lymphoid tissue below the Eustachian tube on the lateral wall of the pharynx.

The amount of blood lost in operations on adenoid tissue is usually more than from the two tonsils combined.

POST-OPERATIVE CARE.

Following operation patients are put to bed, kept on their right side as far as possible in Sims's position, with head low so that in case there is any bleeding from either tonsillar fossa or naso-pharynx, it is easily noticed by the nurse as coming from the mouth or nose.

There is a marked difference in the reaction of children, say under six years of age, and adults following the operation. The young child in six or eight hours has completely recovered from the anesthetic, is often sitting up and playing with toys, takes its food regularly with apparently very little if any discomfort, and the loss in body weight and strength is consequently little. On the other hand, older children and especially adults are considerably more prostrated, the pain following the operation is very noticeable and deglutition difficult for several days. The amount of water and nutriment taken in is insufficient for their bodily needs, and at the end of a week many of them have lost weight and feel weak in consequence.

COMPLICATIONS.

ONE, *Hemorrhage:* Of the complications incident to the operation there is one greatly feared by the patient and family physician, namely, hemorrhage. We feel that the question of tonsillar hemorrhage is one that has been imperfectly understood and also, perhaps, treated.

There are two types of consecutive hemorrhage—one that comes on shortly following the operation, usually within twelve hours—the other several days later. If the fossa has been left dry before the patient leaves the operating table early hemorrhage simply indicates that a vessel temporarily thrombosed at the time of operation, either by pressure, clamp, or ligature, has had the thrombus extruded and bleeding recurs. The tonsillar fossa if examined at this time will usually be filled with a clot on a level with the surface of the pillars and the blood will be found trickling down the pharynx underneath the clot. The proper treatment of such a condition is the rapid removal of the clot so that the bleeding point may be discovered, an artery clamp placed on the point and a ligature applied. We have never seen a case where this treatment did not immediately arrest the hemorrhage.

Hemorrhages may occur later in the course of healing. These are due to the dislodging of the exudate in the tonsillar fossa involving the vessels whereby the thrombosed vessels re-open. It is not surprising that with the continual movement of the pillars of the fauces and the tonsillar fossa during deglutition and talking that such breaking loose of exudate should take place. A blood clot will be found in the fossa as above narrated and if removed the bleeding point may similarly be secured with clamp and ligature if necessary.

Fifteen patients have had hemorrhages from their tonsillar fossa requiring to be controlled. There were six males and nine females. The youngest patient was thirteen years of age and the oldest was 45 years. Dividing them into the two classes we find that nine bled within twelve hours after operation. The youngest patient so to bleed was 18 years of age and the oldest 41 years. No patient bled between 12 hours after operation and the fifth day. Of the six remaining patients who bled late, three began to bleed on the fifth day and three on the sixth day. One of the patients who bled six hours after operation resumed bleeding on the fifth day and again on the seventh day, and again on the twelfth day following operation. She was supposed to be a bleeder, but the coagulation period (Biffi-Brooks method) was seven and one-half minutes, taken by Dr. Sondern. Blood pressure 170 mm. Hg. There was no unusual bleeding at the time of operation. Ligation of the first hemorrhage and slight pressure subsequently controlled the bleeding.

Another patient also supposed to be a bleeder was, on the advice of her family physician, fed with gelatin and calcium lactate for several days before the operation. The operation was uneventful so far as bleeding was concerned. Patient remained in the hospital until noon of the sixth day, when she motored to her home, about 30 miles from New York. At 2 A. M. the next day she was awakened by severe bleeding from the right tonsillar fossa which the local physician was unable to control, and she continued bleeding until I arrived at 8:30 A. M., when moderate pressure and powdered suprarenal gland controlled the hemorrhage, which recurred slightly in about one hour. Pressure controlled it and no further hemorrhage took place from that tonsil. Six days later, namely, on the thirteenth day, spontaneous hemorrhage occurred during the night from the left tonsil. This the local physician was able to control by pressure.

One patient 45 years of age bled five days after operation. Hemorrhage controlled by pressure.

By referring to our table it will be seen that 15 tonsil cases, or 1 7/10% had hemorrhages. Of the 130 patients over 40 years

of age that we have operated upon only two have had hemorrhages, or 1 3/10%.

HEMORRHAGE FROM ADENOIDS.

There were two cases of hemorrhage from the adenoids. A boy of 10 years bled a few hours after operation, in moderate amount, and six days later to such an extent as to require the introduction of a plug in the posterior nares. Blood entered the tympanic cavity, infection ensued and dissected up the scar of a previous mastoid wound. The otologist brought in in consultation deemed it necessary to re-open the mastoid.

The other adenoid hemorrhage occurred six hours after operation in a woman, age twenty-four years. The hemorrhage had ceased spontaneously before we arrived.

ACIDOSIS.

Those children who are subject to attacks of acidosis while their tonsils are in situ are frequently similarly affected post operatively. Such children, in contradiction to those we have described before, will persist in vomiting for 24 or 48 hours, sometimes longer, and their recovery from the operation is delayed varying with the degree of acidosis.

ACUTE OTITIS MEDIA.

We have had but one acute otitis media develop immediately after tonsillectomy. The case is recorded above.

LUNG ABSCESS.

We have had one case of lung abscess following tonsillectomy.

T. A. S., 50 years, had been subject to attacks of tonsillitis before coming under our care. He suffered from diphtheria in March, 1919; acute tonsillitis in May, 1920. Tonsillectomy was advised and performed under local anesthesia June 11, 1920. Operation was performed in the upright position and less than a dram of blood was lost from the two tonsils combined. Immediately after the operation patient was placed in a wheel chair, taken to his room in the hospital and put to bed, given a hypodermic injection of ¼ grain of morphine sulph. to relieve the pain. Thirty-six hours after the operation, in the middle of the night, he complained of severe pain in right side. He had been subject to so-called rheumatic pains and his case was diagnosed by the house surgeon as intercostal neuralgia. A thorough physical examination was made the next morning by a very competent internist, who concurred in the diagnosis and strapped his chest. Patient had a slight rise in temperature, 101°.

Many adults have such a temperature 24 to 48 hours after operation. Patient also complained of cough, painful, but less so since

strapped. He left the hospital one week after the operation and went to his home. He continued coughing and in July, about one month later, suddenly shot a temperature and had an attack of pneumonia. Following his pneumonia he had an empyema and coughed up quantities of foul smelling pus. His empyema was operated upon, rib resected and after a rather stormy course lasting well on into November, he has made a complete recovery. In this case it seemed to us, and to the physicians and surgeons in charge of him, that an infective thrombus dislodged from a vessel in a tonsillar fossa and was carried into the right lung as an infected embolus. Aspiration of blood at time of operation could not in any way be considered a real factor in this case.

DEATHS.

So far as known but six patients have died since operation.

No. 1. Mr. C. C., aged 57 years, examined on February 4, 1910. He complained of persistent sore throat for the previous three months. His tonsils were moderately hypertrophied, red and contained considerable thick and thin secretion. Tonsillectomy performed on February 5, 1910. Last seen on February 19, 1910. Patient died December 7, 1917, six and one-half years after operation. We have been unable to ascertain the cause of his death.

No. 2. E. L. deF., Jr., 12 years of age, examined on November 15, 1911. Mouth breather, frequent colds and headaches. Enormously hypertrophied tonsils and adenoids. Operation November 20, 1911. Operation successful. Was seen on October 23, 1912, November 20, 1915, with an acute rhinitis. On May 8, 1919, he developed an acute meningitis. Lumbar puncture; cloudy fluid; many Gram positive diplococci, penumococcus, type IV. Patient died May 9, 1919.

No. 3. Mr. H. A. S., age 36 years, was referred to me by the late Dr. Richard Weil on December 19, 1911, also by the late Dr. Theodore Janeway. He was below par and had a slight chronic cardiac valvular lesion. His tonsils were medium size, congested and contained much detritus. His physicians were anxious for him to get in better physical condition and to avoid all sources of infection that might result in an acute infective endo-carditis. Operation was performed on December 27, 1911. Uneventful recovery. Tonsils were placed in a sterile petri. dish and sent to the Rockefeller Institute for Medical Research. On January 4, 1912, Dr. Simon Flexner reported as follows: "I could cultivate no bacteria from the tonsils of Mr. S. The tonsils are, as you doubtless noticed, very fibrous. I shall send a histological report later." On January 23, 1912, acute rhinitis

and pharyngitis; June 6, 1912, another attack of rhinitis and pharyngitis. September 24, 1912, slight acute rhinitis and pharyngitis. April 30, 1913, slight sore throat, slight thickening of the lymphoid tissue on the posterior pharyngeal wall. Sinuses normal. On May 14, 1914, I was asked to see the patient at his residence, to try to discover a possible source of infection, for what at that time was suspected as an early stage of infective endo-carditis, although the blood was still bacteria free. A thorough examination of nose, naso-pharynx and sinuses showed them to be entirely negative of infection. I understood that later bacteria were found in the blood. Patient died September, 1914, of an acute infective endo-carditis. It is rather remarkable that this patient who had his tonsils enucleated mainly because Dr. Janeway felt that it might be a prophylaxis against an acute endo-carditis did develop the disease after his tonsils were enucleated.

No. 4. Mr. J. S. F., age 38 years, was referred to me by Dr. F. S. Meara for chronic rheumatism. He was able to get around only on crutches. His tonsils were moderately large and contained a moderate amount of secretion. Dr. Meara reported that he was unable to find any other source of infection and advised an enucleation of his tonsils. Operation at St. Luke's Hospital, March 5, 1913; considerable secretion in tonsils and very adherent, such as one sees when there is a history of frequent peritonsillar abscess, although patient did not give a history of having had quinsy. Tonsillar fossa healed well. Dr. Norwood, his last physician, reports that patient died November 18, 1918, of endo-carditis.

No. 5. Mr. M. L. D., age 21 years, examined October 30, 1916, with a history of recurring attacks of acute tonsillitis. His tonsils were red, enormously hypertrophied. Operation October 31, 1916. Patient was killed in action in France.

No. 6. Master F. W. M., age 12 years, referred to me by Dr. Geylin, had had glycosuria for about one year. He had large infective tonsils and adenoids. The operation was done with the hope that his diabetes might be benefited by enucleating the infective tonsils. Operation November 21, 1918, tonsillectomy and excision of adenoids. Patient made an uneventful recovery from the operation. His father, an officer in the Medical Corps of the U. S. A., states: "My boy died August 12, 1920, as a result of exhaustion caused by an acute intestinal toxemia, which naturally merged about two hours before death into coma. The removal of the tonsils and adenoids unquestionably improved his general condition. I think I omitted to tell you that the joint pains, especially in the knees and hips from which he had long suffered, entirely disappeared, and permanently.

immediately subsequent to operation. It would, of course, be impossible to state how much the diabetic state was improved since there were no spectacular results. The most I can say is that he did better afterward than he had before and I have no scruples in believing that his life was indirectly prolonged. This, however, has only the value of mere speculation, as you will perceive."

The following questionnaire was mailed to each of the 926 patients. Where it was known to have been received but not answered, it was sent a second time, and if no response was obtained, a letter or telephone message was sent in addition. Of the 926 questionnaires sent out we received replies from 689 patients—74%. Sixty were returned to us by the postal authorities as not located at the address, and 172 received the paper but did not reply.

CHART NO. I.

Our records show that you had your tonsils and adenoids operated on ..... We are endeavoring to collect data on the results of all of our tonsil cases and we would greatly appreciate your assisting us by answering the following questions:

1. What caused you to decide to have your tonsils removed?

2. How many previous operations on your tonsils?

3. Has your general health been (better) (worse) (unchanged) since your last operation?

4. Had you suffered from rheumatism before operation?
If so, are you (better) (worse) (unimproved) since your operation?

5. Had you had measles, scarlet fever, whopping cough, St. Vitus' dance, chicken pox or diphtheria before operation?..... after operation?.....

6. Had you ever had quinsy before your last operation?..... After it?.....

7. Did you suffer from frequent "colds in the head" before operation?..... If so, are they less frequent now?.....

8. How frequently did you have any trouble with your ears (earache, discharging ears) (a) previous to operation?..... (b) after operation?.....

9. Has anything led you to believe that your tonsils have grown again?..... If so, what?.....

10. Did you have a general anesthetic (ether) for your operation? ....., or a local anesthetic (cocain)?.....

11. Will you please state in a general way your impression of the results of the operation on your tonsils and adenoids?

We have reviewed the answers to each question separately and have formulated our statistics exactly from the replies of the patients. Where the answers indicated that no benefit, or only a partially beneficial result ensued from the operation, they were carefully checked up from our history records and from a re-examination of the patient wherever possible and the final results thus tabulated.

The statistics with the results of the operation will now be analyzed.

Question No. 1. Etiology, as stated by the patient.

There were 41 different causes given by the patients for the removal of their tonsils and adenoids. 17 did not answer the question and 86 indicated by their replies that they had no very clear idea just why the operation was performed, but had undertaken it upon the advice of their physician. As these statistics cover a period of nearly 12 years, it is not strange that some of the patients should have forgotten, or were too young at the time of the operation to remember, the exact cause.

244 patients, or about 41% of the cases who gave a definite answer to the question of etiology, had the operation performed for the relief of local throat conditions. Chart No. 2 gives the detailed classification of these answers and the results of the operation as reported by the patient.

CHART NO. 2

		Entirely Successful	Partially Successful	Not Benefited
A. Advice of physician	83			
B. Throat trouble—				
1. Frequent sore throats	69	60	0	9
2. Frequent tonsillitis	81	77	0	4
3. Diseased tonsils	36	36	0	0
4. Quinsy	18	17	0	1
5. Diphtheria	4	4	0	0
6. Vincent's Angina	1	1	0	0
7. Enlarged tonsils	35	35	0	0
S. Enlarged Cervical Glands	27	19	4	4

In reviewing these cases we found that very frequently the patient used the term "sore throat" and "tonsillitis" as if they were synonymous and as denoting failure to remove all of the tonsil.

Frequent Sore Throats. Of the 9 cases who reported no benefit resulting from the operation because they continued to have frequent sore throats, all were examined and in only one case was any tonsillar tissue. Of the eight other cases, one had sinus disease with a profuse post-nasal secretion; one had a deviated septum and hypertrophy of the turbinates so interfering with nasal respiration as to cause a dry pharyngitis from mouth breathing, while 5 had hypertrophy of the lymphoid tissue on the lateral or posterior pharyngeal walls. This tissue varied in amount from small islands dotting the surface of the pharynx to large compact masses extending downward along the lateral pharyngeal walls behind the posterior pillars of the fauces. There appears to be no question that lymphoid tissue capable of hypertrophy to a considerable degree may be, and often is, present extra-capsular to the tonsils. It has frequently been noted situated in the pillars themselves, sometimes well up on the soft palate

where its removal is not feasible. This tissue appears to be of two types, one with more or less definite crypt formation and another type without crypt formation. French has described a type which contains crypts, yet we have had specimens examined in the Department of Pathology at the College of Physicians and Surgeons, Columbia University, which failed to show any crpyts. The following report from Prof. Jobling, Professor of Pathology at P. & S., on one of the specimens we submitted is a typical example:

"Material. Post-pharyngeal lymph gland.

"Microscopic note.—The surface epithelium is everywhere intact and appears normal. In the central portion of the section the surface is slightly depressed, but there are no evidences of crypts. Beneath this there are several large lymph follicles which appear somewhat edematous, but otherwise normal. The surrounding tissue shows some small round celled infiltration."

This tissue, whether containing crypts or not, may be the seat of local inflammations causing pharyngitis which the patient describes as a sore throat or a tonsillitis. We have also seen not a few cases where physicians have mistaken this condition for tonsillitis. This hypertrophy is especially prone to occur in children approaching the age of adolescence, although we have also noted it at times in adults over thirty.

Diseased Tonsils. Of the 36 cases giving diseased tonsils as the chief complaint there were no unsatisfactory reports. The same is true of the 35 cases of hypertrophied tonsils.

Quinsy. Quinsy was the next most common etiological factor—18 cases. Only one of these reported any attacks after the operation. This case reported for examination and a piece of tonsil was found in the right fossa, which might well have been responsible for the quinsy.

Diphtheria, Vincent's Angina. The 4 cases of diphtheria and the one case of Vincent's angina reported no recurrence of the condition.

Enlarged Cervical Glands. Enlarged cervical glands were the chief cause of operation in 27 cases. Of these 19 reported entirely successful results, 4 stated that the glands were greatly reduced in size but not entirely gone and 4 reported no benefit. Of the latter we were able to trace all of the 4 cases and found that 3 of these had had their glands removed and pathological examination proved them to be tubercular. One of these three cases had several X-ray treatments, yet when removed many of the small glands showed lymphoid tissue in nearly normal amounts. One case, after increasing rapidly in size, was removed and found to be a Branchial cyst.

Ear Conditions. There were 42 cases where ear trouble was given as the primary cause for the removal of tonsils and adenoids. They were described as indicated in chart No. 3.

		Entirely Successful	Partially Successful	Not Benefited
Deafness or impaired hearing	15	9	0	6
Ear trouble	13	..	..	..
Frequent ear-aches	5	5	0	0
Abscess in ears	6	4	0	2
Tinnitus	2	1	0	1
Slow healing mastoid	1	1	0	0

Of the 15 who complained of impaired hearing or deafness, there were nine who reported their hearing as restored to normal and six who were not benefited. Of the nine entirely successful cases, three were adults who had noticed a gradual yet progressive impairment of hearing. The most striking of these cases was that of a commander in the U. S. Navy, who was shortly to come up for promotion and who would have been retired for physical disability because of the marked impairment of his hearing. He first noticed that he was having difficulty in hearing while on duty and frequently could not locate the direction from whence a sound came. Examination showed a mass of adenoid tissue in the vault of the naso-pharynx and about the fossa of Rosenmuller. After removal of this tissue (under general anesthesia) his hearing rapidly returned to normal and he passed his physical tests and was duly promoted.

Of the six cases not benefited all had had badly impaired hearing for some years. One case two years of age had been practically deaf since birth; one case was 13 years old, one was 18 and one was 22, and two were between 40 and 45 years of age.

Mouth Breathing. As indicated in chart No. 4.

		Entirely Successful	Partially Successful	Not Benefited
Mouth breathing	35	31	2	2

There were 35 cases who sought relief from mouth breathing. Of these 7 were operated for adenoids alone and 28 had both tonsils and adenoids removed. Of the total number 31, or 88%, reported entirely successful results, two were partially successful and 2 reported no benefit. Of the two who were not benefited, one was reexamined and found to have a profuse nasal discharge from a sinus infection, but no recurrence of adenoids; the other had a recurrence of adenoid tissue and was re-operated by us recently with an entirely successful result.

Systemic Conditions. About 20% of the answers to question No. 1 gave some systemic condition as the chief cause for operation.

There were 55 different conditions mentioned, all of which are classified with the results of the operation in chart No. 5.

Miscellaneous Cases		Entirely Successful	Partially Successful	Not Benefited
1. Heart conditions	5	3	2	0
2. Kidney conditions	5	4	1	0
3. Bronchial conditions	4	3	1	0
4. Influenza	3	3	0	0
5. Persistent cough	7	6	1	0
6. Chronic catarrh	4	3	1	0
7. Toxemia-acidosis	3	3	0	0
8. Stomach trouble	2	1	0	1
9. Headaches	2	1	1	0
10. Unexplained temp	1	1	0	0
11. Recurring phlebitis	2	1	0	1
12. Military service	3	3	0	0
13. Eye condition	4	1	1	1
(One not answered)				
14. Repeated pharyngitis	2	1	0	1
15. Secondary anemia	1	1	0	0
16. Asthma	5	1	1	3
17. Vasomotor rhinitis	1	1	0	0
18. Diabetes	2	0	1	1
Rheumatic Conditions—				
1. "Rheumatism"	32	29	0	3
2. "Arthritis"	9	4	2	3
3. "Neuritis"	5	3	0	2
	46	36	2	8

		Entirely Successful	Partially Successful	Not Benefited
Frequent colds	111	98	4	9
"General run-down condition"	16	15	0	1
Not answered	17			

Only the more important ones need be discussed in detail.

Heart Cases. There were 5 heart cases referred to us in which the tonsils were thought to be an etiological factor. All of these cases had definite heart lesions which seriously incapacitated them. Of these 5 cases 3 were reported by the patients themselves, and the report confirmed by their physicians as being entirely successful. A case referred to us by Dr. Leo Kessell will serve to illustrate the type benefited. This case was a boy aged 10 years who had a slightly enlarged heart with a systolic murmur. His heart lesion incapacitated him so as to prevent him from participating in the usual activities of boys of this age. After the removal of his tonsils his murmur disappeared and he is now able to indulge in all the sports with his schoolmates. The remaining two were reported as improved, but not entirely free from symptoms. Four of these cases were operated on under general anesthesia and one under local anesthesia.

Kidney Lesions. We had the same number of kidney lesions as heart cases—5. All were cases of acute nephritis with albuminuria and in all these cases all symptoms completely disappeared after operation. Four of these were done under local and one under general anesthesia.

Asthma. Of the 5 asthma cases operated on, one was free from symptoms immediately after operation and has had no return of symptoms in nearly six years; one reported a partially successful result in that her general health was somewhat improved, and 3 reported no benefit.

Diabetes. The diabetic cases, two in number, operated on in the hope of improving their general condition by removing a focus of infection in the tonsils or adenoids, both failed to receive any benefit as far as the diabetes was concerned. One of these two cases, a boy of 12 years, died about two years later.

General Malaise. We had 15 cases whose chief complaint was a general run-down condition. Eight of these cases were children between the ages of two and twelve, and 7 were adults. All of these cases had been free from any severe illnesses and had not suffered with acute throat infections. Among the children definite symptoms and physical signs were as a rule absent. They appeared to be lacking in vigor, were listless and irritable, had poor appetites and failed to gain in weight or strength as a normal child should gain. The results in these cases were completely successful—often as startling to the parent as they were gratifying to the operator. Not only did they gain in weight and strength, but their mental attitude changed. From cross, unruly children, inattentive and uninterested in their surroundings or studies, they soon became mentally alert and active.

(The cases complaining of rheumatism and colds will be considered in detail under the questions dealing exclusively with these conditions.)

Secondary Operations.

CHART 6.

Number of secondary operations on tonsils	145
Number of others operated on once before	115
Number of others operated on twice before	23
Number of others operated on three times before	2
Number of others operated on four times before	1
Number of others operated on several times before	4
Number of our own cases we had to operate a second time	1
Number of our own cases others operated a second time	3
Number of secondary operations on adenoids by us	5
Number of secondary operations on adenoids by others	2

As shown in chart No. 6, 145 cases, or 21%, had had their tonsils operated on before they came to us. 155 of these had had one pre-

vious operation, 23 had had 2 previous operations, 2 had been operated on three times before, one four times and 4 had been operated on several times. It would seem that this is an amazingly high record of failure for any common surgical operation, and indicates either a faulty technic or a lack of skill so great as to place an unjust burden on the patient and a stigma on the profession.

Of our own cases we had to re-operate on the tonsils in one case 5 years after the first operation, and three patients we had operated on reported that another surgeon had to operate a second time.

Of the adenoid cases we had to re-operate on 5 cases which we had previously operated on and two of our own cases reported that other surgeons removed their adenoids a second time.

In analyzing the remaining questions, which deal with conditions which were not necessarily factors in persuading the patient of the advisability of removing their tonsils and adenoids, we are aware that the results are subject in some cases to a varying degree of error. This is especially true of the third question, relating to the state of general health after the operation. There are so many factors which might influence the general health of a patient after any operation, that it is hard to estimate with any degree of accuracy whether any given operation is a primary or merely a contributing cause in the result. However, of the 689 cases returning questionnaires, all but 14 answered this question. 577, or 85%, reported that their general health was better; 86, or 12%, as unchanged, and 10, or 3%, stated that it was worse.

Question 4. Rheumatism. We now come to a consideration of rheumatism, its frequency before operation and how it was influenced by the operation. It has been difficult to obtain accurate data on the type of rheumatism in most of the cases where rheumatism was not the *primary* reason for the operation. For example, 107 cases reported that they had had rheumatism previous to operation, but only 46 of these gave rheumatism as the primary reason for the operation and in only 46 cases is any mention found of it in our case records. All sorts of vague myalgic pains and joint symptoms are often regarded by the laity as rheumatism, and except in the cases where our history files record attacks of a rheumatic nature, we have not been able to verify or refute the patients' statements.

Analyzing the 107 cases who stated that they had had rheumatism previous to operation, we find ten, or 9%, reported as cured; 75 cases, or 71%, as better, and 22 cases, or 20%, as unimproved, one not answering the question as to the result. On the other hand, analysis of the 46 cases who gave rheumatism as the primary cause for the operation, both on our history records and on the questionnaire, only 8, or 17%, reported unimproved. In the unimproved

cases 3 were cases of chronic arthritis, 3 were acute rheumatic fever cases and 2 were cases of neuritis. One case, a boy of 8 years, developed acute rheumatic fever for the first time, about 2½ years after the removal of his tonsils. He had been told that it was due to some tonsil tissue remaining in the fossa. Examination of his case showed a clean tonsillar fossa and no recurrence of adenoid tissue, but did disclose a right antrum filled with pus. This was irrigated daily until clear and the boy is now free from symptoms. Another boy 10 years old had acute rheumatic fever previous to operation, was relieved by operation and free from symptoms for 5 years. Since then he has had 2 attacks of rheumatic fever. Examination showed no tonsillar tissue present, but a hypertrophy of the lymphoid tissue on the posterior and lateral pharyngeal walls. He had 5 X-ray treatments to reduce and sterilize this tissue, but when last seen March 14, 1921, there was no apparent diminution in either the size or number of these lymph nodules. Another case, a female aged 40, had suffered from many attacks of arthritis for several years. Her condition slowly improved after the removal of her tonsils and adenoids and a year later she was free from symptoms and remained so for 8 months, when the arthritis again returned. Examination failed to reveal any tonsillar or adenoid tissue remaining nor were there any lymph nodules in the pharynx. The extraction of three teeth, said to have shown an abscessed condition, failed to influence her condition, nor has any focus been found after repeated examinations by her physicians, a most competent internist. All of the 8 cases here reported as not benefited have been re-examined and in no case was any tonsillar tissue found in either fossa. This leads one to conclude that other sources than the lymphoid tissue in the oro- and naso-pharynx must be responsible in some cases for various rheumatic conditions.

Question 5. The occurrence of the acute infectious diseases before and after operation.

This question was asked in the hope of being able to obtain data relating to a possible immunity from the acute infectious diseases in children who had had their tonsils and adenoids removed. The results are not definite enough to warrant any conclusions being made.

Question 6. The occurrence of quinsy before and after removal of tonsils.

Fifty-three cases, or about 8%, reported attacks of quinsy prior to operation. Of these 55 cases, only two stated that they had any attacks after operation. One of these two was a boy 8 years old, who was told by his family physician when ill about 3 years after operation, that he had tonsillitis and quinsy. He was re-examined and not a trace of tonsillar tissue was found. The second case did

have some tonsillar tissue remaining. One case is reported as not having had quinsy before operation, but of having an attack about a year after operation. No answer was received to our request to report for re-examination or to send us the details of the attack.

Question 7. Frequency of colds before and after operation.

Frequent colds in the head were reported by 68% of our cases—472 patients out of 689. The results after operation were reported as follows:

Entirely successful	Partially successful	Not benefited
346 or 73% cases	32 or 8% cases	92 or 19% cases

There were six cases who reported that they had colds in the head much less frequently since operation, but that now their colds, instead of being confined to the head, manifest themselves as attacks of pharyngitis and bronchitis. We are at a loss to explain this.

Question 8. Ear Conditions.

The presence of adenoid tissue in the naso-pharynx and of diseased tonsils in the oro-pharynx must always be considered as a potential factor in the production of trouble in the middle ear. That the removal of diseased tonsils and the removal, as completely as possible of the adenoid tissue will not grant full insurance to the health of the middle ear is, of course, obvious. We feel, however, that the operation tends to lessen the frequency and severity of the attacks. We regret that our statistics on the ear conditions are not more accurate as to the exact nature of the ear trouble. After receiving our replies we discovered that the question was not worded specifically enough and we fear that some suffering from an otalgia may have reported it as an otitis media. 23% of our cases complained of some kind of ear trouble before operation. They were described as:

Frequent attacks of earache before operation	108 or 66%
Frequent attacks of discharging ears before operation	53 or 34%

	Results after operation		
	Entirely Successful	Partially Successful	Not Benefited
Cases of earache	74%—80 cases	7%—7 cases	19%—21 cases
Cases of O.M.P.A.	69%—37 cases	11%—5 cases	20%—11 cases

There were 7 cases of acute otitis media occurring after operation (but not as a complication of the operation), which had to have mastoid operations. Four were single mastoids and three were double mastoids.

About five per cent of our cases had no ear trouble of any kind previous to operation, but did have trouble with the ears after operation. Thus we find that 66 cases, or about 9% of all of our cases had earaches or acute otitis media after the removal of their tonsils and adenoids, and that 77% of these 66 cases occurred in children between the ages of one and ten years.

Question 9. Recurrence of tonsillar tissue after operation.

There were 62 cases who reported that there was tonsillar tissue present after operation. All of these cases were asked to report for examination, but only 15 complied. Of these 15 cases only 3 had any tonsillar tissue remaining in the fossa.

Question 11. Patient's opinion of the results, as a whole of the operation.

CHART VIII.

Patients' statements of the results of the operation.

A.	Total number reporting satisfactory results	529
B.	Total number reporting unsatisfactory results	82
C.	Total number not answering the question	78

Unsatisfactory results.

A.	No beneficial result noted	18
B.	Result unsatisfactory	34
C.	Operative indication not relieved	30
	1. Phlebitis	1
	2. Sore throats	9
	3. Colds increased	4
	4. Discharging ear not cured	1
	5. Rheumatism not cured	9
	6. Recurring attacks of pharyngitis and bronchitis	6

CONCLUSION.

Our experience leads us to believe that:

I. Where the pathological condition of the tonsil warrants its removal, age is as negligible a factor as it would be in any other common surgical operation.

II. Hemorrhage, either during or after operation, can and should be controlled according to the same surgical principles which govern its control elsewhere in the body during a surgical operation.

III. A well done tonsillectomy and adenoidotomy causes a marked lessening of the acute infections of the upper respiratory tract and lessens the tendency towards attacks of acute middle ear infections.

IV. The percentage of successful and partially successful results in cases of rheumatism justify the removal of tonsils in cases where the tonsils are proved to be diseased and where the elimination of other sources of infection have failed to give relief.

V. Cardiac and renal cases associated with infected tonsils should be studied with care before advising tonsillectomy lest serious results ensue. In properly selected cases the percentage of successful results justifies the operation.

VI. When the operation is well done, with the view of relieving a definite pathological condition, the percentage of successful results is most gratifying.

TWO UNUSUAL NASO-PHARYNGEAL TUMORS.*

Dr. Gordon B. New, Rochester, Minnesota.

Unless the nasopharynx is examined routinely in all patients with complaints around the head and neck, many interesting and important observations may be overlooked. I have emphasized this point in a previous paper, an analysis of forty-six nasopharyngeal tumors.[1] Recently I have examined two nasopharyngeal tumors of special interest. One actinomycosis of the nasopharynx, an exceedingly rare condition, and one primary lymphosarcoma of the nasopharynx without symptoms in any way referable to the head. This was found in the course of a routine examination.

ACTINOMYCOSIS OF THE NASO-PHARYNX.

Case 1 (35993), Mr. A. E. A., aged 45, a farmer, came to the Clinic, January 31, 1921, because of difficulty in opening his mouth and pain in the left ear and upper jaw. He had first noticed this one month before. The pain radiated around the left eye and into the left ear and mastoid region. There was a slight decrease in hearing in the left ear. Three teeth had been extracted without relief from the pain or the ankylosis of the jaw. He had been given morphine for two weeks.

A mass, not ulcerated, was found in the vault of the nasopharynx on the left side; it almost protruded to the midline. It was impossible to see the Eustachian tube. The left tonsil on this side was slightly enlarged, the nose and throat findings were otherwise negative. The patient could separate his teeth less than 1 cm. The left ear drum was slightly retracted. There was no external swelling around the head. The eye and neurologic examinations were negative. The Wassermann reaction was negative. It was questionable whether the mass was inflammatory or malignant. The patient and his physician were told that it would not be advisable to remove tissue for diagnosis, as the treatment would not be surgical in either case. Radium treatment into the nasopharynx and outside the temporal region was given. Seven weeks afterwards the patient returned to the clinic, a phlegmon having ruptured in the left temporal region just above the zygoma, from which actinomyces were demonstrated grossly and microscopically. The pocket was drained

*Presented at the staff meeting of surgical specialists, Worrell Hospital, Rochester, Minnesota, June, 1921.

thoroughly, swabbed with iodin and packed wide open. Potassium iodid was given internally and radium treatment continued.

Four months after the first examination the wound in the left cheek had almost entirely healed, the nasopharynx was negative, the jaw opened normally and no further pockets had formed. The patient's general condition was much improved and he had no pain.

COMMENT.

This is the first time I have observed actinomycos involving the nasopharynx and causing a tumor which might readily have been mistaken for a malignant growth. The most common location

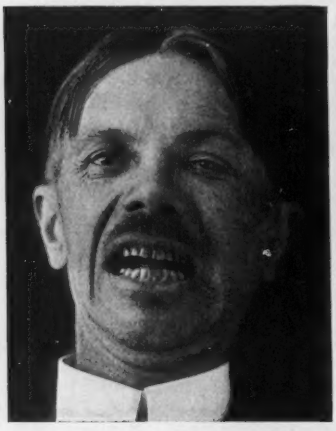


Fig. 1 (35993). Patient with nasopharyngeal actinomycosis which ruptured externally on the cheek There was no external swelling at the first examination when the nasopharyngeal mass was present.

Fig. 2 (294938). Patient with primary lymphosarcoma of the nasopharynx which did not cause symptoms. The tumor was found on routine examination.

around the head and neck for actinomycosis is usually in the submaxillary and cervical regions, and many of these cases are taken for simple phlegmons, the result of tonsillitis or infected teeth.

Just how the infection reached the nasopharynx in this case is questionable. The patient was a farmer, and had taken care of cattle with this disease. The infection may have gained access to the nasopharynx by direct extension along the inner surface of the ascending ramus of the jaw from the tonsils or teeth, the nasopharynx becoming involved secondarily. No other lesion was visible at the time of the first examination and the history does not aid in determining the source of the infection. The severe pain, and

the huge, hard tumor in the nasopharynx would usually justify the diagnosis of malignancy; fortunately a guarded opinion was given. After thorough drainage of the temporal region, the pain entirely disappeared and the general condition improved. The patient is taking potassium iodid up to 200 gr. three times a day. Radium is being applied over the temporal region, neck and into the nasopharynx. The prognosis, of course, is questionable on account of the location of the disease and the possibility of meningeal involvement.

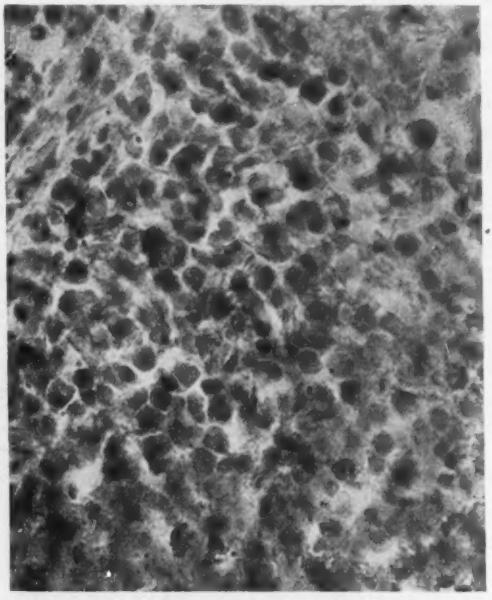


Fig. 3 (294938). Photomicrograph of nasopharyngeal lymphosarcoma.

PRIMARY LYMPHOSACOMA OF THE NASO-PHARYNX.

Case 2 (294938), Mrs. T. O. N., came to the clinic October 29, 1919, complaining of a small area on the left tip of the nose which was causing a burning sensation. Small scales had been forming on the left tip of the nose and she was worrying about the condition being a cancer. She had no other complaint in her nose, throat or head. Her general health was good. Examination of the outside of the nose showed a very small area of keratosis on the left tip. In the right vault of the nasopharynx, in and above Rosenmuller's fossa, a tumor about 2 cm. in diameter was found. There was no

definite ulceration. The tissue removed from the tumor for microscopic diagnosis was lymphosarcoma. There were no glands palpable in the neck. The eye and ear examinations were negative. The hemoglobin was 78 per cent, the erythrocytes 4,054,000, and the leukocytes 12,500; two hundred cells were counted, the polynuclear neutrophils were 75.0, the small lymphocytes 16.5, the large lymphoyctes 6.5, the esosinophiles 1.5, and the basophiles 0.5. Wassermann reaction and the urinalysis were negative. A diagnosis was made of primary lymphosarcoma of the right nasopharynx.

COMMENT.

Primary lymphosarcoma in the nasopharynx without symptoms is a very unusual condition. I have seen similar cases in which the glands of the neck were involved and in which the primary growth in the nasopharynx was without symptoms. This, however, is the first case I have seen in which there were no symptoms or signs of disease and the routine nasopharyngeal examination was the only way in which the tumor could be found. Radium treatment in a case of this type is very satisfactory and may permanently clear up the trouble.

BIBLIOGRAPHY.

1. NEW, G. B.: The relation of nasopharyngeal malignancy to other diagnosis. Minn. Med., 1921, iv.

REPORT OF AN UPHOLSTERER'S TACK IN THE RIGHT MAIN BRONCHUS FOR SEVEN YEARS. REMOVAL BY PERORAL BRONCHOSCOPY. DRAINAGE OF LUNG ABSCESS. RECOVERY.

DR. JOHN D. KERNAN, JR., New York.

Hilda H., 21, U. S. The following case is remarkable for the length of time the foreign body was in the lung, and for the fact that although her sickness dated from the aspiration of an upholsterer's tack, of which she gave a clear history, this fact was never ascertained until she had passed through many hospitals and clinics and through the hands of many physicians. Her sputum had been repeatedly examined for tubercle bacilli, always with negative results; her chest had been X-rayed on two occasions without finding a foreign body, and twice the right pleura had been aspirated

and no fluid discovered. She was admitted to the Presbyterian Hospital, Medical Ward, November 6, 1920, complaining of haemoptysis for the past 18 months. Her family history was negative. She was found to live and work under good conditions. And with the exception of measles and whooping cough in childhood, she had been well up to the age of 14. At that age she had an attack of pneumonia, which kept her in bed for 4 months. During this entire period she had fever, night sweats, sharp pain in the right axilla and a hacking cough. The cough has persisted ever since. At varying intervals she has been forced to go to bed with fever, night sweats and exacerbation of her cough. As a rule these attacks lasted 2 weeks. The last was in February, 1919. In May, 1919, the patient coughed up blood for the first time. In May, she felt first a severe epigastric pain followed by a tickling sensation in the chest. Then blood was coughed up. At intervals of several weeks since then the haemoptysis has recurred. The last haemoptysis occurred on the day of admission to this hospital. There has been no loss of weight.

The patient was admitted to a large hospital in September, 1919, and again in September, 1920. On both the X-rays of the lungs were reported negative, and no tubercle bacilli were found on repeated examination. On these occasions attempts were made to aspirate fluid from the right base, which were not successful.

Physical Examination on Admission: The positive findings were confined to the lungs. The right lung showed slightly diminished expansion and a triangular area at the right base behind, where there was diminished voice, breath sound and fremitus. Transient groaning and crepitant rales were heard all over the right lung.

While in the hospital the patient had several attacks of paroxysmal cough, during which a variable amount of fresh blood was brought up.

Examination of sputum for tubercle bacilli—negative on 2 occasions. Red blood cells 4,500,000. Haemoglobin, 85 per cent. White blood cells 11,700. Polys 76 per cent. Lymphocytes 18 per cent. Trans 4 per cent. Lm. 2 per cent.

At this stage of the proceedings it looked as though we, at the Presbyterian Hospital, were to meet the same fate of failure in diagnosis until one of the interns thought to ask her whether she had ever aspirated a foreign body. She answered: "Of course." Three weeks before her first attack of pneumonia, she was standing up one day with a tack in her mouth, and suddenly turned round to speak to some one. As she did so, the tack went down her throat.

This was followed by coughing, wheezing and pain in the zyphoid region. Catharsis was given and one stool was searched, but the tack was never found.

The lesson of this story is that patients should always be questioned directly as to the possibility of a foreign body, and no trust put in their spontaneously giving the information. Having secured the correct history, the rest was easy. The X-ray plates were carefully searched, and the shadow of what was thought to be a tack, sharp end up, located near the base of the right lung, close to the spine, behind the heart shadow.

Operation: Morphin gr. 1/8 A. 1/100. Cocain. 9 mm. tube. Bronchus was closed just about the origin of first dorsal branch by a mass of granulation tissue. Continuation of lumen posterior to this. An alligator forceps was pushed through this opening and a considerable amount of thick pus released. Lumen dilated with the forceps. Tube then replaced by 7 mm. This pushed into an abscess cavity at the bottom of which the edge of the head of the tack could be seen in the wall of the cavity. This was grasped and removed. Further search of this area revealed a mass of black tissue, which was taken to be the disentegrated tack and removed. Cavity cleaned by pumping and sponging. Opening of other bronchi could then be seen below. Time 40 minutes.

The patient made an uneventful recovery. Haemoptysis ceased and signs in lungs disappeared. A safety pin swallowed was passed by rectum. X-ray of chest negative. Discharged November 21, 1920.

Points in History: 1. Story of foreign body missed for years by good men in good institutions. 2. Negative X-rays. 3. Excellent condition of patient—no clubbing of fingers, etc.

Readmission 11/23/20: Remained home 2 days after first discharge from hospital, then returned in hysterical condition, complaining of severe cough and pain in chest. These symptoms cleared up on reassuring the patient, but slight cough continued. No fever. X-ray of chest negative. Lungs scattered signs of bronchitis. Patient hysterical when told she must leave hospital, but quieted down. Slight dullness and diminished breath sounds and voice sounds at right base.

156 East 79th St.

FURTHER THOUGHTS CONCERNING TESTS FOR AVIATORS.*

DR. CHARLES MOORE ROBERTSON, Chicago.

In May, 1918, I had the pleasure of reading a paper before this Society entitled, "A New Test and Method of Classification for Labyrinth, Muscle Tone and Blood Pressure Findings."

At this time I desire to ask your consideration of certain points which were suggested, but which were not then positively proven, and which have been added to in somewhat more extensive observations by myself and others.

To quote from that paper, I first wish to call attention to the type of man which the essayist had in mind as a possible aviator.

"To be an aviator, a man must be physically qualified, his eyesight must be normal without glasses, and his ear must respond to tests for nystagmus, past pointing and falling.[1]

"This gives us a man who is perfect as a type, but is that enough?"

Again, "For ordinary maneuvering close to earth, the man does not require to be so finely adjusted, for he is in a medium of air almost of the same density and condition as air at the earth's surface.

"This does not hold true, however, for the aviator who ascends to more than a thousand feet, as when he has attained a greater altitude, he experiences varying conditions of density and temperature, which change in a direct and fixed ratio at the different levels.

"Were it the practice of the aviator to ascend and descend to any given altitude at a moderate rate of speed, he might not have to be chosen with so much care; but we know that he must change his altitude suddenly, and in many instances to a great amount, so that he is subjected to violent variations of temperature and especially air pressure, sometimes within a few seconds."[1]

The work which I at that time described to this body, had been conducted in the year previous to the reading of my paper, and for that reason, it was made before the work which the Government was beginning at Mineola, during the early part of 1918. (The Medical Research Laboratory began its active work about April 1, 1918.)

At the time the Government was considering the work on tests which it afterward began at the Research Laboratory at Mineola,

*Read at the Fifty-fourth Annual Meeting of the American Ootological Society, Atlantic City, N. J., June 2, 1921.

it was suggested to one of the officers who was active in formulating the research work, that the tests which were at that time contemplated, were inadequate, and the writer outlined to the Surgeon General's Office, that the examinations were not sufficient in scope, as they tested aviators only at ground levels and the result thus obtained would not show how the man would deport himself after the ground conditions were altered by altitude in actual flight. This conversation occurred in May, 1917, which was, I think, prior to any work done by the Government other than the organization of the different units, which were later to do the aviation examinations at the several points selected later.

It is not my object to claim priority, but simply mention this fact in passing, to show that the work I am presenting at this time, as well as the work read you in May, 1918, was original, and if any priority is merited, I naturally seek it, as the report from the Surgeon General's Office failed to do me that favor.

I do not wish to give the impression that I am trying to tear down anything which was done, and I am not antagonizing any of the thoughts that were brought out by the Surgeon General's Office, but rather to tell you how it appears to me, and let you form your own conclusions.

It was, of course, necessary to form some hard and fast rules to be a standard in all tests for aviators, and the Board which adopted these rules made it necessary that applicants for the air service should have normal sight, without glasses, a certain fixed amount of accommodation, giving a slight amount of latitude, and an amount of vertigo upon turning equal to twenty-six seconds, with a variation of eight seconds each way, together with proper past pointing and falling, and furthermore, the applicant must be of sound body.

No one could take exception to this ruling, for this gave the examiners a working plan which standardized their methods in the several units distributed over the country. It was thought that a man who had vertigo must always exhibit his vertigo by an expression of eye movement and that no matter how much, nor how frequent his turning, the resultant nystagmus must be constant. (This view was modified lated, but not until the near end of the war.)

After the orientator was introduced, some of the members of the Otologic service found that vertigo could be reduced in duration and amount, although I have not heard that the loss of nystagmus was admitted.

In my own examinations it was noted that vertigo was not a constant factor, as it varied at different times in the same individual.

This, however, was not at this time considered, as the view advanced by others at that time was accepted as true.

My work was confined to testing men by putting them through the actual conditions of flight.

I soon found if a man were placed in a pneumatic chamber and the air pressure reduced from the external surface of the body, the nystagmus, past pointing, falling, muscle strength and blood pressure were markedly affected.

My first series of applicants, all of whom were enlisted aviator cadets chosen by the Air Service, were put through a test equivalent to a flight which attained one mile in altitude, ascending at the rate of 1000 feet per minute, and being returned to the air pressure at the earth's surface in 30 seconds, which corresponds to the speed used in an actual flight.

After the flight the cadet was re-examined and the result showed the time of nystagmus was shortened in about 80 per cent when turned to the right, and 90 per cent when turned to the left. (10 turns in 20 seconds.)

Past pointing, falling and muscle strength were affected in about the same proportion. The muscle strength was reduced about 50 per cent in 80 per cent of cases.

In the second series of cadets the results were still more pronounced, as two flights were done in succession, instead of one.

Nystagmus was affected in this series in 95 per cent of cases turned either to the right or left. The changes in the blood stream will be taken up in another part of this paper. It was determined in actual service with fliers that the duration of nystagmus varied in the same individual on different days, and after eating, exercise, alcoholic drinking, or taking certain kinds of drugs, on the same day.

This variation amounted often to 10 seconds, at times higher, but in most cases, less in duration.

If a man felt fit the nystagmus was found to be very much less so I came to regard the length of eye movement in fliers as a very unreliable test.

As muscle power controls accommodation, so fatigue, worry or intestinal imbalance have a decided influence as well as vascular irregularities and it thus becomes a poor index of stabilization.

Vertigo lasts no longer than nystagmus, and nystagmus no longer than vertigo. The two are not separable and we found intelligent men who, when instructed to indicate by sign the moment vertigo ceased, would do so at the exact moment the eye movement disappeared.

I found that re-turning aviators, together with the training they were receiving from evolutions in the air, actually reduced the nystagmus duration. Thus, a man with 16 seconds' nystagmus would reduce to 10 seconds or below that amount, while a man with 30 seconds would come down to half or less that amount after he had been turned a number of times.

This, of course, does not include all aviators, as the results in some remain constant or increased; in such cases, however, some other element enters to make the man deport himself in this manner, such as staleness or irritability.

Re-turning each day, over a period, should reduce the nystagmus two or three seconds per day until the nystagmus reduces to a fixed amount or disappears altogether, and this reduction once attained, seems to be almost constant for a considerable length of time, as Griffith[2] has shown after a man whose nystagmus was eight seconds at the end of his practice course, had no more than ten seconds at the end of four months' rest.

What may be said of nystagmus can be said of past pointing and falling, as the process involves the same mechanism.

We had many cases where men could point properly and where falling was overcome completely. In the test for the fitness of the aviator, the Government felt that a test for *Oxygen Want* was all that was necessary, and you are familiar with the method of examinations made at Mineola and the several camps where the rebreather was inaugurated. I spent six weeks at the Medical Research Laboratory at Mineola, and although the work was extremely interesting, every man doing his best with the task before him, it seemed to me there were important phases of the conditions which the aviator must meet, which were not touched upon and which seems to me to be vastly more important than low oxygen tension.

The condition which has struck me most forcibly is not oxygen want, but the pressure change in atmosphere to which the aviator is exposed alternately, and sometimes with great rapidity.

I made a special point of this in my paper in 1918, and it still impresses me as being the greatest feature to consider in aviation.

In the Air Medical Service, published by the Surgeon General's Office,[3] it states: "The flier must undergo abrupt changes in atmospheric pressure and oxygen supply. *Atmospheric pressure plays a very unimportant role; the whole problem resolves itself into a deprivation of the normal oxygen supply.* (Italics mine.) The fact that there is 'oxygen want' at high altitude suggested that any piece of apparatus that would permit the breathing of a reduced amount

of oxygen could be used to test the ability of men to withstand high altitude by changing the oxygen in the rebreathing apparatus, by introducing nitrogen gas, the man can go down to 8 or 7 per cent of oxygen before he succumbs, which is equal to 25,000 to 28,000 feet altitude."

"This determination is made on the ground, without danger to the aviator, or his machine, and has been taken as a basis for the classification of aviators."[2]

This view was not taken by other armies, as we quote from the same book, page 112. Major J. L. Bitley, R. F. C., England, writes describing symptoms from high flying, which he divides into "Symptoms From Fall of Oxygen Pressure,[4] SymptomsFrom Fall of Atmospheric Pressure."

He divides the effects into two heads: 1 During flight, a, vertigo and fainting; b, nausea and vomiting; c, pain in one or both ears; d, frontal headache; e, desire to micturate and parched tongue; f, physical fatigue; g, diminished sense of stability.

2 After flight, a, frontal headache; b, pain in ears; c, palpitations; d, trembling of hands, etc."

He states that "The diminution of pressure on the body surface has, so far as I am aware, received but scant attention."

"The subjective sensations in the lines may be reasonably ascribed to this factor." "Remote effects of continued high flying." "A great number of pilots present evidence of emphysema, as shown by the percussion note, together with diminution or even obliteration of the normal area of cardiac dullness. In several pilots the apex beat has been found to be the left nipple line and in one case one-half inch external to nipple. Several officers have premature beats at regular intervals."

Again on page 125, in a lecture by Dr. Guilbut, French Air Service.[5] "In descent the heart beats stronger. The heart beats are increased in volume and in proportion to the rapidity of the descent. At the moment he reaches the earth he feels a buzzing of the ears, maybe of such intensity that the pilot is deaf to the roar of his motor even through osseous transmission. He feels a sensation of disagreeable tension in the ears, due to the difference of pressure on the two sides of the drum membrane, on the one side the exterior atmospheric pressure and on the other side the intra tympanic pressure and *perhaps the intra vascular.*"

We know, when a man goes up in an airplane, he is getting into thinner air the higher he ascends, and in doing this, the surface of the body is losing pressure on the skin and lung tissue. This takes

the external pressure off the heart, so the pulse accelerates, causing a reduction of the pressure of the blood stream. This has been established by actual measurement in flight.

On the contrary, in rapid descent, the air becomes more and more dense as the aviator gets nearer the earth's surface, and the pressure, which was removed from the external surface of the body, is suddenly and violently appiled once more, which acts as a block to the blood entering the surface vessels, causing a back pressure on the heart, with an attendant sudden elevation of the blood pressure.

In lower animals this sudden pressure change has resulted in hemorrhages into the tissues, causing paralysis of motor or sensory arears. Von Stein found in lower animals frequent hemorrhages into the labyrinth and cerebral hemorrhages, causing paralysis of limbs.[6]

German observers have written that in post-mortem examinations of fallen aviators, the lungs were frequently found torn and cases of rupture of the aorta was found a number of times, caused by the sudden pressure which was put upon the heart and pulmonary vessels. There were numerous reports of cases where the plane of a fallen aviator was covered with blood where the subject was not smashed in the contact with the earth at the time of the fall. I mention this point to show that the body is subjected to immense variations in the blood pressure and we can realize what takes place in the inner ear when the supply is so violently changed, causing an anemia in ascent, and an irritation from an ischemia of the labyrinth in rapid descent. Many aviators who fell to death retained control of their ship until near the earth's surface, at which time they became unconscious and thus lost the ability to guide their ship.

In my former paper I gave the findings of the blood pressure and told at that time that of the cases examined, some had a great reduction of both systolic and diastolic readings, while others had a sudden rise in the blood pressure, with a few where the findings were not changed. In my series of cases the time in the cabinet was too short in duration to experience oxygen want, and the change in blood pressure was so marked that it seemed to me to be of the greatest importance. My statistics showed that in 94 per cent of cases there was change in the systolic and in 86 per cent in the diastolic pressures.

At that time there were a number of the applicants who had been accepted into the air service in which the blood changes showed pure shock, and those men, when allowed to fly, should have deported themselves badly. In those whose blood pressure withstood the

strain, by being the same or higher after the test, I made a favorable report, recommending them as fit. I had hoped to be able to report at this time the number of crashes which these young men had encountered, but I have been unable in interesting the Government in furnishing the data I asked for. It was my dream to interest the Government in the great importance of this side of the problem in their work at Mineola, but my dream was short lived and the work still remains undone.

There is another side still to this question. The rotation chair, or better the orientator, demonstrates the fact that a person can become to a degree, at least, immune to labyrinthian stimulation, as indicated by the presence of vertigo, with nystagmus, as patients who are treated by rotation in the orientator find after ten or fifteen minute treatments that the vertigo can be overcome in a limited time varying with the individual. It is possible, for we know how quickly students learn to past point correctly, and the falling test is reduced to not over 5 degrees from the vertical, while I have seen many pilots sit straight up as soon as the revolving chair was stopped.

In my paper I made the statement that "provided a man had a functionating labyrinth, the one who had the least labyrinthian stimulation was the best man for flying." This same man, when trained in the chair or orientator, will soon become immune to vertigo and would be the very best risk possible for a flier or a balloonist. I stated that there was a device made to supply our aviators with oxygen, as well as to supply the engine with the same gas, and if this be done, the question of oxygen want can be eliminated.

The English Government made some reports on squadrons which were supplied with oxygen gas in flights and they reported the men who were thus supplied did six times the amount of work without fatigue than those not thus supplied could do. Air Med. Serv., p. 32. Heating devices aid the aviator in keeping warm, and it may be by this and a supply of oxygen perhaps, with an amount of carbon-dioxide gas that the dangerous spots may be cut down in aviation, but there can be no means by which the great air pressure changes can be eliminated, and it seems to me that this is the one thing we should observe if we are to understand the conditions in the science of air navigation. I am informed that the Government has discontinued research work in this field. They are well equipped and the subject of aviation is with us at this time to remain, for it bids fair to become a common means of travel. This science is intimately connected with our work and we should use our influence to see that the experimental work is continued.

We will be called upon to give our views on the proper examinations for pilots and men who will be in the business of aerial transportation service, and it is possible that a part of our business will include treatment for the prevention of air sickness by some device such as the orientator or some device made for the same purpose. To me the subject is one of great interest, and the more thought I give it the more do I become impressed with the point given you today.

BIBLIOGRAPHY.

1. COLEMAN, R. GRIFFITH: Tr. Amer. Otol. Soc., 1918.
2. COLEMAN, R. GRIFFITH: The Organic Effect of Repeated Bodily Rotation and an Experimental Study of Dizziness. *J. of Exp. Psychol.*, Vol. III, No. 1-2, 1920.
3. Amer. Med. Rev., p. 18, p. 25.
4. Amer. Med. Rev., p. 112.
5. Amer. Med. Rev., p. 125.
6. Internl. French, Arch. Oto-Laryngol., 1911

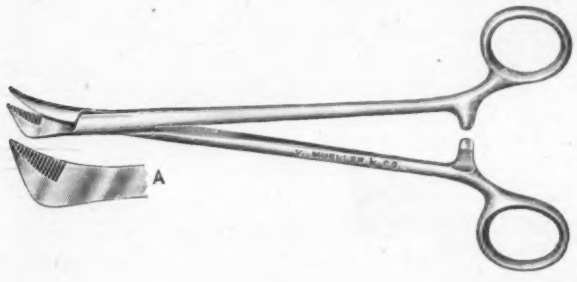
30 North Michigan Boulevard.

A NEW TONSIL HEMOSTATIC FORCEPS FOR LIGATION OF VESSELS IN THE TONSIL FOSSA AND OTHER DEEP CAVITIES.

DR. HOWARD V. DUTROW and DR. ALFRED G. FARMER,
Dayton, Ohio.

The instrument herein described has been developed in our nose and throat practice. It has proven of such practical value in our hands that we feel justified in inviting its attention to those of our colleagues who care to investigate its merits for themselves.

Every laryngologist recognizes the value of ligating bleeding points after tonsil enucleation. As a surgical operation the procedure of tonsil enucleation is not complete until hemostasis has been estab-



lished, and certainly there is no reason why the ligation of bleeding points is any less rational or of any less value in the tonsil fossa than in surgery of any other part. We often experienced difficulty, in ligating bleeding points, in getting the ligature free of the end of the hemostat, and after removing the hemostat we were frequently chagrined to find the ligature come away also, having been knotted around the extreme end of the instrument and not around the bleeding point, as desired.

To overcome this difficulty we have had made an ordinary tonsil hemostatic forceps with the addition of a shoulder on one blade of the seizing end. The shoulder has a slope of about 45 degrees and

is about one-eighth of an inch high, the peak of the shoulder forming the apex of a triangle with the shaft of the instrument at its base. The bleeding point is picked up in the usual way, the ligature knotted over the shaft of the instrument and the loop pushed over the shoulder and drawn tight, the incline of the shoulder forcing the loop when tightened over the end of the instrument.

In our work we have found No. 1 iodized catgut to meet our requirements in ligature material to the best advantage. In the throat we have found that a single knot is all that is necessary to retain the ligature and control bleeding.

This instrument would be applicable and practical in ligating a bleeding point in surgery of any deep part, such as gall bladder, where the ligature has to be placed in situ largely by feel.

To those having short fingers or having difficulty in drawing the knot tight down in the throat or other cavity, the suggestion is made that after the loop is knotted it may be placed over the shoulder and tightened by grasping the free ends of the ligature in two pairs of ordinary forceps and using these to make traction.

1040 Fidelity Medical Bldg.

DIAGNOSIS AND TREATMENT IN LATERAL SINUS THROMBO-PHELEBITIS.*

DR. J. B. GREGG, Sioux Falls, S. D.

In this necessarily brief article, I shall take up only the more salient factors in the diagnosis and treatment of lateral sinus thrombophlebitis. To the otologist, the proper treatment of this intra-cranial complication has always been of the utmost importance; since it is a condition in which procrastination is inexcusable. True, certain cases of lateral sinus involvement do recover as evidenced by the report of Dr. Day of six cases of spontaneous cure of unrecognized thrombosis, the condition not being suspected until found accidentally during operation. Other cases of thrombosis of the lateral sinus without sepsis have been reported and are to be encountered if we but look for them. Whether or not to operate, and if to operate, when it should be done, are points requiring considerable judgment on the part of the surgeon.

Diagnosis: In the first place it is often impossible to make a pre-operative diagnosis of lateral sinus involvement; there is no typical symptomatology, so that one must depend on the combination of symptoms, laboratory data and operative findings.

Symptoms; Temperature: The symptom which first attracts attention is sudden and very marked rise of temperature, from normal or slightly above normal to 103° or even 105°F. During the period of pyrexia, the patient is flushed, and has the appearance of being exceedingly ill; and he may complain of severe headache, usually on the side of the lesion. These head symptoms vary; may consist of heaviness and pressure feeling on the side of the lesion, or intermittent sharp pains in the temple. The temperature, after maintaining its high level for several hours, suddenly falls to normal or a little above normal. The febrile period varies in length, and during this stage there is usually a general feeling of exhilaration and well being. Usually in twenty-four hours, but in some cases not until two or three days have elapsed, the temperature mounts rapidly to near the previous level, and the course of symptoms of the first febrile attack are repeated. From this time, the clinical course usually assumes a markedly periodic character, high fever and remission succeeding each other at fairly regular intervals.

---

*Read before Sioux Valley Eye & Ear Academy at Omaha, July 12, 1921.

In less than 50 per cent of cases, a true chill occurs before the sudden rise in temperature. More often we find the patient has a chilly feeling just before the attack; and that his clothing becomes dampened along with the fever.

Optic neuritis is present in from 10 to 15 per cent of cases of obstructive sinus involvement. In Crockett's series of 60 operable cases, optic neuritis was present in 25 per cent, but this is a larger percentage than is recorded by other observers.

Hyperemia of the disc, in a case presenting the other symptoms of sinus involvement would indicate rather definitely an obstructive lesion; yet absence of all ocular changes would not exclude a diseased sinus.

No constant physical signs can be depended upon; but one of the most constant signs is edema, with pitting, and tenderness over the area drained by the mastoid emissary vein. This never extends beyond the posterior border of the mastoid. In some cases of acute sinus involvement, the inflammatory process extends back along the mastoid vein to its point of entrance at the mastoid foramen, causing noticeable tenderness at this point. While the position of the foramen varies somewhat, it is usually about one and one-fourth to one and one-half inches behind the orifice of the cartilaginous meatus and on a level with its floor. This tenderness may, however, be simulated by an extension of inflammation backward through a pneumatic mastoid to the large cells frequently present in this region. Personally, I have not placed much reliance on this condition.

Tenderness on pressure along the course of the jugular vein may be caused by extension of inflamation to the jugular bulb and then along the walls of the vein. This condition is rather unreliable, as it may readily be due to inflamed cervical glands. The recognition, by deep palpation, of a thrombosed jugular vein is both improbable and also impracticable, since this manipulation might readily dislodge and force into the general blood stream a portion of the infected clot, producing not only systematic poisoning, but possibly also disseminated metastatic foci of infection. Evidences of secondary foci of infection (abscesses in various parts of the body) may be found—in the later stages.

Occasionally a case is met with in which the aural discharge is absent, or apparently absent, and no history of former discharge can be obtained. Numerous cases of this class are reported. There is another type of case in which there either has been no discharge at all, or in which the discharge has been trivial and has continued only a few hours or days.

Laboratory Data: The blood count in septic thrombophlebitis follows the general laws which control its changes in other suppurative conditions. Usually the white count will rise to 15,000; in some cases to 24,000; with an overwhelming infection there may be no increase in the number of white cells.

The polymorphonuclear percentage is usually also raised, the average being around 80 per cent, but this may be even higher.

Bacteriemia may or may not be present, depending on the time when the culture is taken, on the personal equation of the bacteriologist, and on the type of thrombus formation. Thus an occluding thrombus in which no particles were being carried into the blood stream would give a negative culture.

Again bacteriemia may be found in other conditions, and all factors should be carefully weighed before reaching a conclusion as to the surgical significance of a demonstrable streptococcemia in cases of middle ear suppuration. Bacteriemia may be found in septic endocarditis, in pneumonia, purulent meningitis, severe tonsillar infection, and in the septic type of scarlet fever. In children having the last named condition, differentiation from thrombophlebitis is indeed difficult. According to Duel and Wright bacteriemia may be present in cases of uncomplicated suppurative mastoiditis. It does not seem to me, therefore, with a streptococcemia in the absence of the clinical manifestations of suppurative thrombophlebitis, that we are justified in diagnosing sinus involvement or for opening the sinus.

Examination of the cerebro-spinal fluid should always be done where there is a possibility of a meningeal infection.

Operative Findings: In all cases of middle ear suppuration with suspected sinus involvement, a complete mastoidectomy is indicated with exposure of the sinus and dura.

Macroscopic changes in the sinus wall may be manifested in various ways: (a) by inflammatory adhesions between bone and dura; (b) by the presence of pus in contact with an apparently healthy sinus; (c) by granulations on the dura; or (d) by inflammatory changes without granulations. The external appearance cannot be relied on to tell us of the condition within the lumen of the sinus, unless there is a fistula or a definite necrosis of the wall. A test puncture is sometimes used but there is too much danger of passing through into the meninges. The collapse of the sinus wall synchronously with inspiration may occur in cases where there is an obstructive thrombus between the exposed sinus wall and the torcular. This also is not reliable.

Before making a diagnosis of sinus thrombophlebitis, all other diseases which might cause like symptoms should be excluded. Among these may be mentioned, pneumonia, typhoid fever, acute endocarditis, malaria, erysipelas and especially pylitis in children. These excluded, the diagnosis is made by the symptoms of septicemia, the laboratory data and the operative findings.

Treatment: The treatment of a suppurative sinus thrombophlebitis is purely surgical, consisting in ligature or resection of the internal jugular vein and the cleaning out of the infected clot. It is important that the upper ligature should be at a point above the facial branch, for there is always present the possibility that septic material, possibly parts of a disintegrating thrombus within the bulb may be washed downward by the blood stream from the inferior petrosal, which, finding its way blocked by the ligature lower down, may be diverted through the common faciolingual branch into other channels; the bacteriemia being thus perpetuated. The operation is relatively simple and requires no description to you who have done this many times. If the jugular vein is thrombosed, it should be resected, otherwise simple ligation is best. With a definite diagnosis, the ligation of the internal jugular should precede opening of the sinus above, thus preventing the entrance of septic material into the general circulation at the time of the operation.

In opening the sinus in order to obtain any practical results, either diagnostic or curative, we must incise the outer wall throughout practically the entire length of the portion exposed.

Unless its lumen is actually filled by an occluding thrombus at the site of the incision, or by thrombi above or below, the incision is followed by a gush of blood. This is allowed to continue for a few seconds in order to gage volume. Free flow of blood does not contra-indicate a clot, either toward the torcular or toward the jugular end of the vessel, for in either position a parietal, nonocclusive clot may be present, and again even with an occluding thrombus toward the torcular end of the vessel, the return flow from the inferior petrosal sinus through the jugular bulb will cause copious hemorrhage.

Pressure is now made on the torcular end of the lateral sinus. If this entirely controls the flow of blood, we know that the sigmoid sinus or jugular bulb is completely occluded, if only a little blood trickles through, we know that the jugular end of the sinus contains a clot which only partially occludes its lumen. If compression of the vessel above exerts no influence upon the hem-

orrhage, we know that the jugular bulb is not occluded, yet there may be an infected parietal lesion present. If the bulb is clotted it should be cleaned out carefully. With the bulbar end of the sinus closed off, the plug above is removed, and if thrombus formation is present, the sinus is exposed until the posterior limit of involvement has been reached. The sinus wall should be exposed one-half to one inch beyond the lesion. Upon completion of the operation, the sinus is packed, both above and below.

In the treatment of infective lateral sinus thrombophlebitis I wish to bring out the apparent value of blood transfusion. This was first brought to my attention in 1917 in a British base hospital, where we had four cases that seemed to be losing ground constantly until transfusion was used, resulting in recovery. One case in which we used transfusion did not recover, but this case was moribund before the transfusion was used.

Since returning to this country I have come in contact with two cases in Dr. Dean's service, where both he and I agreed that the transfusion seemed to produce remarkable results. One of these cases was a young boy with acute double mastoiditis with sinus involvement on one side. The other was a young woman whose case I shall report, inasmuch as it is rather unusual. To us it did not seem possible that these cases could have lived without the transfusion.

In looking over the literature I find where Dr. Robert Lewis reports a case of a young girl where the temperature remained of a septic type for a good many weeks, positive blood culture with recovery following two transfusions. Dr. J. Morrisette Smith reports a case of septic involvement with very good results following a blood transfusion of 500 c.c. being given by the Citrate method. Dr. Joseph Weinstein has given a preliminary report of two cases of sinus thrombosis which, after all the regular procedures had failed to give relief, were apparently cured by blood transfusion.

A case I wish to report is that of a girl of twenty-one who entered the University Hospital and had a simple mastoidectomy right, March 7, 1920, marked necrosis being found at the tip of the mastoid and at the angle of the sinus, mastoid of hemorrhagic type; culture showed hemolytic streptococcus. The dura was exposed in the middle fossa and the sinus uncovered at the knee, both appearing healthy. There had been no symptoms pointing toward sinus involvement.

Blood count just before mastoidectomy was 16,600 white cells, with 86 per cent polys. The temperature which had been around

102° before the operation descended to nearly normal, until two days after operation it rose to 103.80°, pulse 112.

Blood count this day 20,400 with 84 per cent polys. The third day after the operation, or March 10, temperature was 102.6°; she had a marked headache right side of head, there was some oedema of each nerve head more marked in the right, and the blood count showed 18,400 whites with 80 per cent polys. She had a slight chilly feeling but not a shaking chill. Blood culture taken at this time was reported sterile by Dr. Armstrong.

The internal jugular vein was ligated and the sinus opened. In the sinus was found a complete thrombus at the knee. The lateral sinus was opened one inch posterior to the knee until free bleeding was obtained and normal simus wall found. Both the superior and inferior petrosals were open.

Following the sinus operation temperature varied between 99° and 103°, daily blood counts showed around 18,000 white cells with from 82 to 87 per cent polys. She gradually lost ground, and had considerable non-localized headache. Blood culture taken March 22, was reported positive for hemolytic streptococcus. The right fundus showed a papilloedema of 2 D. The same day, March 22 temperature rose to 103.6° blood count showed 19,200 whites with 85 per cent polys. General and spinal fluid examinations were negative.

This same day the lateral sinus was opened further back to within one and one half inches of the torcular. The sinus was found necrotic where the superior petrosal enters it, also posteriorly.

Immediately following the operation she was given 500 c.c. of blood by the direct method. This was followed by a chill, the temperature rose to 104.6° to descend to 97° the next morning.

The next day the blood count was 14,600 with 84 per cent polys and following this, gradually became less.

April 1, she had considerable edema of the eye lids, was drowsy and on awakening complained of severe headache. There was a distinct papilloedema bilateral, but more marked on right side and there was a distinct paresis of the left external rectus. The conjunctivae were distinctly chemotic. This condition gradually cleared up until she left the hospital May 7 in excellent condition.

This case was considered a cavernous sinus thrombosis, secondary to a lateral sinus involvement.

CONCLUSION.

1. The diagnosis of septic lateral thrombophlebitis depends on: (a) Mastoid suppuration with symptoms of periodic septic absorb-

tion. (b) Mastoid suppuration with bacteriemia, the other causes of bacteriemia being ruled out. (c) Distinctly gangrenous changed in the sinus wall at the time of operation.

2. The treatment of this condition is ligation of the internal jugular and the cleaning out of the thrombus.

3. The apparently good results obtained from blood transfusion require careful consideration. In our cases at least, it seemed to cause an almost immediate cessation of symptoms and lead the way to recovery. I would urge that you try transfusion in these cases.

BIBLIOGRAPHY

1. DAY, E. W.: LARYNGOSCOPE, November, 1915.
2. WEINSTEIN: Trans. Am. Acad. of Ophth. and Oto-Laryn., 1920.
3. SMITH, J. MORRISETT: New York Acad. of Med., Oct. 8, 1920.
4. LEWIS, ROBERT: Annals of Otol., Rhin. and Laryn., March, 1920.
5. KOPETSKY: LARYNGOSCOPE, Dec., 1920.
6. HUNTER, TOD.: Jour. of Laryn. & Otol., Jan., 1921.

Security Bank Building.

TONSIL SUCTION (GLASS) TUBE FOR DIAGNOSIS AND TREATMENT.

DR. LEE M. HURD, New York.

Description: The tubes are made in three sizes, namely: No. 1. 12 x 18 mm., No. 2. 15 x 21 mm., No. 3. 16 x 25 mm.

I have been using these tubes about ten years and released the models to the instrument makers last year, and now only know two houses which are manufacturing correct models.

They are used for diagnosis of chronic infective tonsils and also for treatment of acute and chronic tonsillar infections.

For *Diagnosis*: A warmed tube of the proper size is attached to the vacuum apparatus. After depressing the tongue by the usual method, the tube is introduced and placed in contact with the tonsillar pillars and about 15 inches of vacuum released. This will partially draw the tonsil from between the pillars into the tube and, if the crypts contain either pus or cheesy material this will be promptly drawn out and by the eversion of the tonsil and opening

of the crypts will immediately show whether the tonsil is diseased or not.

The discomfort caused by the procedure is in direct proportion to the amount of the vacuum used, below 15 inches it is slight and above that is considerable. Also, the higher vacuum tends to cause hemorrhage.

When a culture from the tonsillar crypts is desired, the tube is sterlized immediately before use and culture made from the discharge caught in the tube.

For *Treatment*: Acute infections in the early stage may be aborted by clearing the crypts and producing hyperemia. In the later stage of acute follicular tonsillitis clearing the crypts of pus and membrane hasten recovery. Five to ten inches of vacuum is high enough in acute conditions.

Subacute or condition of plugged and inflamed crypt is manifested usually by pain about the tonsil or is reflected to the neck and ear, plus slight toxic absorption. Suction with 15 inches of vacuum will usually evacuate crypt and promptly relieve condition.

Chronic septic tonsils: A course of evacuation of the cryptal contents plus the hyperemia produced will greatly improve the local condition, but I regret to state that it will not cure or relieve toxic conditions sometimes produced by the tonsil, such as arthritis.

For bedside use the tubes can be connected to a metal syringe with rubber tubing and the syringe plunger pulled out by an assistant until the desired amount of vacuum is attained.

39 East 50th Street.

PRIMARY ADENO-CARCINOMA OF THE BRONCHUS.*

DR. CHARLES J. IMPERATORI, New York.

A. C., 50 years; married; waiter. Native of Hungary. Admitted to Bellevue Hospital, March 27, 1920.

Family History—Is negative in as far as carcinoma or tuberculosis is concerned.

Previous History—Had pneumonia when 12 years old; otherwise has never been ill. However, was never strong and vigorous. For the past ten years has felt weak and usually tired. Denies lues.

Summary of Present Illness—(1) Poor health with onset of weakness, beginning ten weeks ago. (2) Cough progressively worse with increased expectoration. (3) Fever. (4) Night sweats. There has been no pain in the chest and no expectoration of blood.

The essential points of the physical examination were as follows: (1) Pyorrhoea alveolaris. (2) Poorly nourished anemic male. (3) Long phthisical shaped chest with signs of fluid or an encapulated mass at the right base. (4.) Heart, endocarditis, compensated. (5) No clubbing of fingers. (6) Laboratory findings; Urinalysis, Negative. Sputum examination for T. B., Negative. No characteristic odor of lung abscess to sputum. Radiographs that were taken at four different times over a period of five weeks show: Inflation at right apex; congestion right and left upper lobe; interlobar plastic pleurisy; marked thickening of pleura right base.

The patient had now been in the hospital about two months, practically all of this time being a bed case. During this time ten sputum examinations had been made, the last two being done by the antiformin method, all with negative results.

Another radiograph taken at this time, May 20, 1920, gave us a diagnosis "abscess of the lung and bronchiectasis." Over this period of two months the patient had been aspirated four times and twice the fluid—which was always small in amount—was examined for T. B., with negative results.

On May 22 the medical men requested that a bronchoscopic examination be done. The examination was done under local anesthesia and the findings are noted below: "Within the right bronchus near its termination, about 5 c.m. from carina to the right and anteriorly there is a mass of granulation tissue about 1 c.m. in diameter through the center of which pus is coming. Some bleeding on

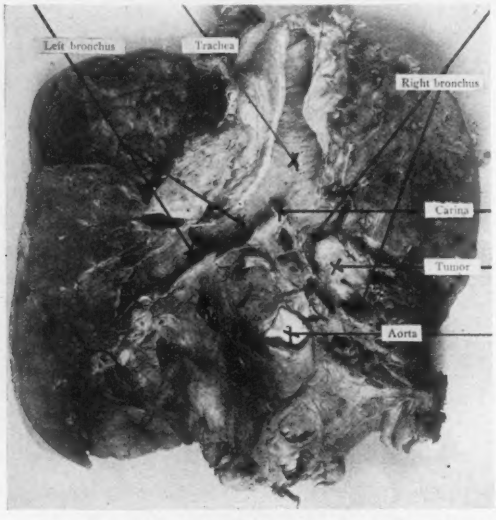
*Read before the Section on Rhinology and Laryngology, New York Academy of Medicine, March 23, 1921.

touching, but appears soft in consistency. The tip of the bronchoscope entered a cavity—the outline or depth was not made out.

At this time the patient was transferred to the Oto-laryngological service and the history continues as follows:

The chief complaint of the patient was that of cough and expectoration of six to eight ounces daily of muco-purulent material, the odor of which was not offensive. Temperature ranged between normal and 100°; pulse 70 to 110; usually comfortable and complains very little.

A report at this time of the secretion obtained from the right bronchus was negative for T. B., although it showed many diplococci that hemolized blood agar.



Trachea, bronchi and lungs viewed from behind. Section made by Dr. James Ewing.

May 24, 1920—Bronchoscoped—local anesthesia. The cavity, easily entered to a depth of over 3 c.m., was washed out with saline solution.

May 28, 1920—Was again bronchoscoped and cavity irrigated with saline, then injected 5 per cent bismuth oil, two drams.

These bronchoscopic irrigations were done on June 6, 12 and 28. In all he had five bronchoscopic irrigations—the first bronchoscopy simply being an examination.

After the second irrigation, the granulation tissue noted at the original examination disappeared almost entirely—the abscess cavity being easily entered.

The sputum became less thick and lessened in amount about four ounces daily.

The patient was up and about the ward and gaining strength daily. In the early part of July he was sent to the country to the Burke Foundation in Westchester County, where he stayed until September 21, 1920.

He was readmitted to Bellevue Hospital Sept. 21, 1920, and was in about same physical condition as in July, excepting that the amount of sputum had increased to about eight ounces.

Bronchoscopic examination done Sept. 24, 1920, was the same as of June 28.

Daily intratracheal injections, formula as suggested by Dr. J. A. Thompson of Cincinnati, were given until October 15, 1920. These were done by the house staff and by the indirect method.

Seven bronchoscopic irrigations and injections of bismuth oil were done from October 15 to November 20.

Atropin	gr. i
Adrenalin Inhalant	oz. iii
Menthol	gr. xl
Camphor	gr. lxxx
Oil Sweet Almond	oz. iv
Liq. Petrolatum	oz. xii

After the second irrigation the sputum was much lessened, being usually four ounces per diem.

Radiographs taken at this time confirmed the former ones.

"There is a large abscess at the base of the right lung in which the horizontal fluid base is easily discernible. This abscess developed on the basis of a large bronchiestatic condition of the lower lobe. There is also a small amount of effusion in the right pleural cavity.

"On November 20 on bronschoscopy a white mass about 6-7 m.m. in size was seen protruding into the bronchus from the region of the abscess cavity. To the tip of the bronchoscope it appeared hard. A piece was removed and sent to the laboratory for examination. The report returned was that the section very strongly suggested adeno-carcinoma.

"The following week, November 28, on bronchoscopy the mass had increased to over 15 m.m. in size, almost blocking the lower part

of the bronchus. Another piece of tissue was removed for confirmatory diagnosis."

The report returned by Dr. McWhorter of the Bellevue Laboratories is as follows:

December 8, 1920—"Section from one of the pieces of tissue show an infiltrating mass of epithelial cells. These cells are arranged either in the form of a sheet or have a primitive glandular arrangement. The cells vary greatly in size and shape, but for the most part resemble the glandular type of cell. The nucleus is very deeply stained and shows mitotic figures.

"Diagnosis—Adeno-Carcinoma."

It was then decided after consultation with Dr. Coakley, the Director of the Oto-Laryngolical Service, and Dr. St. John, the Di-

Photomicrograph of the tumor (adeno carcinoma). Section taken from the mass at necropsy. From the Pathological Laboratory of the General Memorial Hospital, through the courtesy of Dr. James Ewing.

rector of the Surgical Service, that further treatment intra-bronchially was futile, and on December 22, 1920, the patient was transferred to the General Memorial Hospital. Here Dr. Quick applied radium four times. In all the patient received 44,000 M. C. hours of radium. However, he progressively lost strength and died January 22, 1921, from a terminal broncho-pneumonia.

Memorial Hospital: Date: Jan. 23, 1921. Autopsy report. Report made by Dr. Ewing.

Body of much emaciated adult male. Long thorax. No signs of status.

Heart rather small, brownish; slight thickening of mitral.

Lungs—Left is congested, edematous. Right lung is firmly bound by old adhesions, especially dense over base and around

hilus. Several large pockets of fluid are inclosed in layers of pluera. At the second bifurcation of right bronchus there is a solid polypoid tumor mass, 2x3 c.m. arising from bronchial mucosa and wall an projecting above into dilated bronchus. The lower lobe consists of a series of cavities lined by granular necrotic tissue and supported by firm connective tissue septa, between which there is some diffuse smooth hepatization. There is an intense purulent bronchitis in both lungs. The trachea seems very wide.

Spleen—moderately enlarged, brownish, firm. Liver—shows chronic passive congestion, and is elongated from rib pressure. Kidneys—size normal; cortex thin markings irregular. Stomach—and Pancreas—normal. Bladder and Prostate—normal.

Sections shows the tumor to be a very cellular adeno-carcinoma with area of squamous cell growth. It probably arises from the bronchial mucosa.

In several portions of the lung tissue about the tumor and throughout the necrotic lobe there are active miliary tubercles and some areas of caseation.

The interesting features of this case are summarized below: (1) The endoscopic observance of the growth. (2) The rapid growth of the cancer, after biopsy. (3) The negative sputum examinations in the presence of a moderately active tuberculosis. (4) A bronchectatic cavity undergoing malignant change. (5) There was no metastasis. (6) Death of the patient within two months of the onset—that is from the time of observance.

In general, primary adeno-carcinoma of the bronchus is not common. Seydel; *Munch. Med. Woch.*, March, 1910, reported 184 cases of malignant tumors of the lung and pluera fom an analysis of 10,829 autopsies; of these 73.4 were metastic growths, 9.8 by direct extension to the lung from neighboring tissues and 16.8 were primary growths. Males were affected four times more frequently than females and tuberculosis was a frequent association.

Primary cancer of the lung possesses but a feeble tendency to metastis.

ABSCESS OF THE LUNG.

DR. LOGAN CLENDENING, Kansas City, Mo.

Abscess of the lung is not difficult to recognize, provided certain factors are taken into account:

First—The recognition of a preceding possible cause.

Second—The predominance of symptoms over signs.

Third—Use of the X-ray.

Fourth—Use of the bronchoscope.

Fifth—The examination of the sputum.

Sixth—Exploratory puncture of the chest.

In the etiologic factors the most frequent and important at the present time is a preceding tonsillectomy; operations on the nose, such as septum resections and turbinate removals, have also been reported. Next comes the inspiration of a foreign body and then a preceding pneumonia. When we depended upon lobar pneumonia to furnish us with lung abscesses, we had very few (less than 2 per cent on 1200 cases, most of them fatal), but now they have become fairly frequent.

In making a diagnosis a consideration of the symptoms is first in importance. The history of the case is that of continued cough, copious expectoration, and sometimes afternoon fever. They are frequently mistaken for pulmonary tuberculosis. The sputum may be very abundant. There is an old tradition that it is very bad smelling; this is true of the abscesses following lobar pneumonia, but not those following tonsillectomy, at least, in my experience. There is frequently loss of weight and small degrees of septic anemia. The latter is more evident to sight than to blood examination. The symptoms of cough and expectoration are, however, usually most prominent, and are those which bring the patient to the physician.

In contradiction to the wealth of symptoms, there is a paucity of physical signs. However, if carefully looked for, with the idea of abscess in mind they may usually be found. The important feature is that the signs are present over a *single small area of the chest.* This means that every square inch under which lung tissue is found must be carefully examined. On inspection one may find a little lagging to the respiratory excursion, on one side of the chest. Over the area involved, either front, back or in the axilla,

there is perhaps some dullness, more likely a distinct creptitation. A localized area of rales is the most constant physical sign. It is quite easy to understand, however, that these physical signs may be entirely absent. Someone has said that it is fortunate for the patient with early pulmonary tuberculosis that his lesion so often lies at

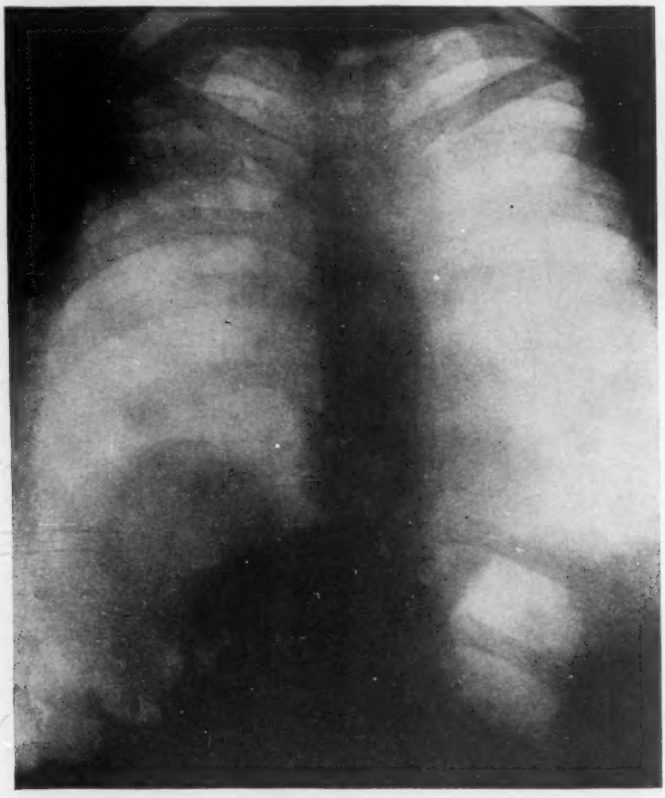


Fig. 1. Lung abscess. Right lower lobe. Abscess near diaphragm. Post-pneumonia.

the surface of the lung, because there it produces signs. The patient with lung abscess does not always, does not even usually, have this advantage. The abscess when it has resulted from the inhalation of septic material, forms at the terminus of a moderate sized bronchus. It is, therefore, deep in lung tissue and surrounded by layers of healthy lung—or at least uninfected lung. This uninfected lung

tissue may become emphysematous, which completely masks both dullness and rales.

The X-ray is of immeasurable value in these cases. In fact, if the X-ray were not used it is likely that many of them would not be recognized. The X-ray shows up the areas that may be missed on physical examination. Plates should be depended upon rather than the flouroscope. The abscesses occur in such unlikely places, and have such soft edges that the flouroscope may entirely miss them. On the plate, the abscess shows as a perfectly definite shadow, not, however, with definite edges. It is dark in the center or in one or two centers, and thins out to a fuzzy edge; outside of this is usually clear lung tissue. The contrast between the sound and the affected side is at once evident. The abscess is usually in the base or near the midline in the lung. This would be natural, on the assumption of the inspiration of septic material as the cause of the abscesses, because the natural route for such material would be into the large dependent bronchi which lead to the lower lobes. The larger bronchus being on the right side accounts for the more frequent involvement of the right side.

The bronchoscope, when available, should always be used. In the first place, the possibility of a foreign body causing either the abscess, or symptoms similar to it, is a most important factor. Then the bronchoscope may exactly locate the abscess in the end of a bronchus, or it may show not abscess, but bronchiectasis multiplex as the real pathology and cause of the symptoms.

The sputum is principally valuable for its negative qualities. The failure to find any tubercle bacilli on repeated examinations makes a point in favor of abscess. There are not always the conventionally recorded elastic fibres present by any means.

Exploratory puncture of the chest, if positive, clinches the diagnosis; not if negative. But there are many warnings to be sounded to him who does his first suspected abscess. In the first place do not expect to get a syringe full of pus. An abscess is not the same as an empyema. The pus is thicker, mixed more with mucus and broken down lung tissue, and it is lying attached to spongy tissue, not as liquid in a cavity. If the exploratory syringe, when you withdraw the piston, gives away instead of resisting and you get a good deal of air with some strings of pus and tissue, that is the typical finding for lung abscess.

In other words, your experience will usually be somewhat as follows: With the X-ray or by physical signs you outline the area in which you suppose the abscess to be. You insert the needle at-

tached to a syringe. You make one or two attempts to withdraw the plunger of the syringe, but find that you can only move it a little ways, and that when you release it, it returns to the same point or nearly the same point on the syringe at which it originally was. But pushing the needle deeper and on another attempt to

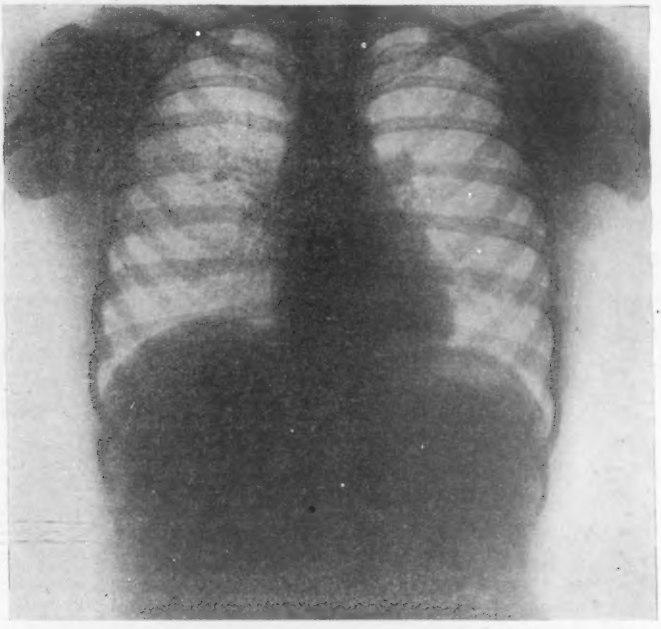


Fig. 2. Lung abscess following tonsillectomy. Motor-driven anesthesia apparatus used. Abscess in right middle and lower lobes. This is the radiograph of my original case as reported (4). Note compensatory hypertrophy of left chest. This was the case which was criticised on the grounds that the abscess was due to the inhalation of a particle of tooth. The tooth was supposed to be near the diaphragm. It will be noted that the abscess itself is much higher up. The patient has been seen by Doctor Chevalier Jackson, in whose opinion there is no foreign body present.

withdraw the plunger, it no longer resists; you pull up air and then some flakes of thick pus, and mucus, perhaps tinged with blood. You have hit the abscess cavity. This is emphasized at what may appear to be undue length, because, almost invariably, you have the feeling of failure. You have gone in to find an abscess and you feel that an abscess should be full of pus. As a matter of fact, these lung abscesses may be very indefinite in boundary and partly filled with air, thus giving these typical puncture findings.

The negative results of tapping are very frequent, much more so than in fluid in the pleural cavity. The reasons for this are obvious enough. The abscess is not usually very large; it may not at the time of attack have any fluid in it at all. Furthermore, it is placed in the center of spongy tissue and is quite as hard to hit as a foreign body.

It is interesting and important to remember that the cause of lung abscess after pneumonia is not always the original organism that caused the pneumonia; it may be due to secondary infection with another organism. In a case, the plate of which is herewith reproduced (Fig. 1), a streptococcus was isolated from the pus when previously a pneumococcus had been found in the sputum. This emphasizes again the necessity for preventing crossed infection in respiratory diseases.

The cause of lung abscess following tonsillectomy has been considerably discussed. Inspiration of septic material, and infarction of the lung have been suggested. Manges[1] reported nine cases and stated in 1916, that lung abscess should not occur if the patient has been properly cared for. This statement will no longer hold. Many cases have been reported by Richardson,[2] Lewis[3] and others, in which with the best of care, lung abscess followed tonsillectomy. Tonsillectomy should, of course, never be done in the presence of an acute infection of the tonsils nor if there is an acute recent respiratory infection.

The fact that they are occurring so much more frequently recently has led me to suggest[4] that they may be due to the use of motor driven anesthesia apparatuses which create a positive pressure in the posterior pharynx, continuously during the operation, thus forcing pus and septic material past the glottis into the lung.

For making this suggestion I have been quite soundly abused by word of mouth, by letter and in print.[5] I still, however, believe that these machines, especially when made in the most powerful form, are partly responsible for many of these cases of lung abscess, and also many cases of pneumonia. In my original article I was not able to assemble all the data which I now have in support of this view. My reasons for my continued belief may be summarized thus:

First, the time argument. These lung abscesses began to appear following tonsil operations after the time when the use of the motor driven anesthesia apparatus became general. The first report of a case was in 1913.[6] The first American cases were reported by Manges[1] in 1916. The anesthetist who introduced the motor driven

anesthesia apparatus in my own community has told me that while their use increased the number of throat operations enormously, he noticed that the patients had a disproportionate amount of trouble afterwards. Many of them, the day after operation had "caught cold," many of them ran a temperature for a few days, and had a

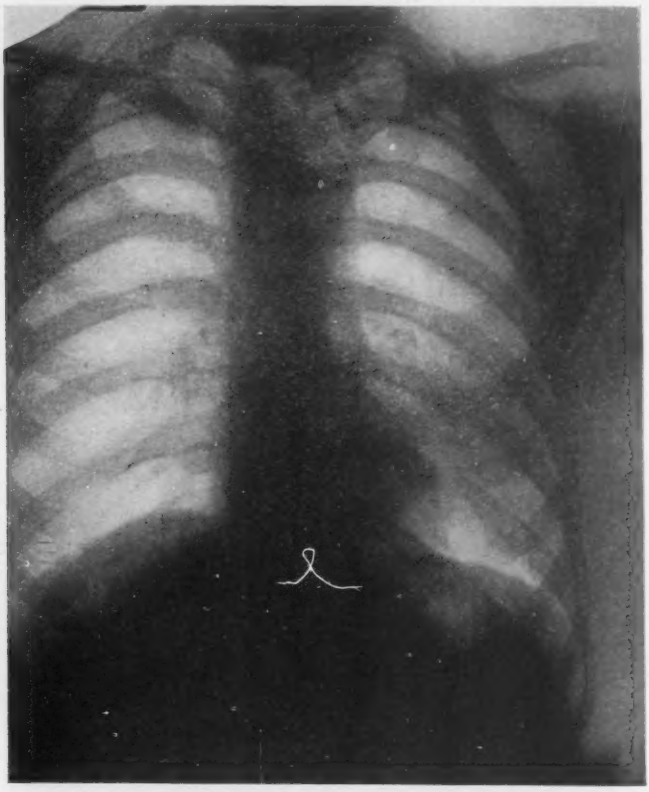


Fig. 3. Abscess left lung following tonsillectomy. Method of anesthesia not known. This radiograph taken before operation.

cough, a few had a more severe time and developed pneumonia; finally, a much smaller number developed lung abscess.

Now, no one has explained to me with any degree of satisfaction just why these complications should have come up when they did. There seem suddenly to have arisen complications which apparently were due to some fault of technique. There had been only one

radical change of technique and that was the motor. Doctor Tewkesbury[7] of Washington, who has had 19 cases of this kind, the first one in 1916, writes me that he believes they occurred before but were unrecognized. I cannot concur in this, however. These patients with lung abscess cannot be overlooked. They cough and expectorate, they run a fever and are insistently sick. The important methods we use to recognize lung abscess were all in general use before 1916; even before 1910, the physical examination of the chest, examination of the sputum, the X-ray. Except in the case of the X-ray, there has not even been any improvement in any of the methods. I think if they had occurred, they would have been recognized.

The second argument is the relational one. All the cases I have, but one, had motor driven anesthesia apparatus used. In this one I have no means of finding out. I asked the Academy of Oto-Laryngologists, in a discussion of the matter before them in 1920, to submit cases of lung abscess following nose and throat operation in which motor driven anesthesia was not used. Three such cases were reported. In my opinion, they are all open to criticism. One, a tonsillectomy, done under local anesthesia, developed a lung abscess, but also a pericarditis and a general septicaemia, which the patient might have had from the tonsillitis alone. The second occurred in a little girl, who was tuberculous, and had a lesion in the chest, before tonsillectomy; the reporter stated that he was so doubtful of the advisability of doing a tonsillectomy on her that he sent her back to the internist for examination, and she was returned to him with the statement that it was safe to do it, as she had no fever. The tonsillectomy was done under local anesthesia and a lung abscess developed. But there were no plates or other evidence to show whether or not it was a lung abscess or simply the lighting up of a septic process already present in the lung. The third case was a posterior ethmoid removal, under local anesthesia, with the development of a lung abscess and subsequent death.

Doctor Tewkesbury,[7] above referred to, in the same communication, tells me that one-half of his cases of lung abscess had a motor driven anesthesia apparatus used, and that he has never seen a case develop after local anesthesia. One case observed by Doctor H. C. Anderson[8] is most instructive. An adult had a tonsillectomy done with a motor driven anesthesia apparatus used. Before operation she was carefully examined and no lung disease found. The day after operation she reported that she had "caught cold." Her temperature was 103° F. She continued in this state for several

days, with negative physical signs. Finally there was discovered *a patch of crepitation and a spot of dullness in the back over the lower lobe on the right side.* On the sixth day she suddenly coughed up a small clot of dark blood with a septic odor, and the physical

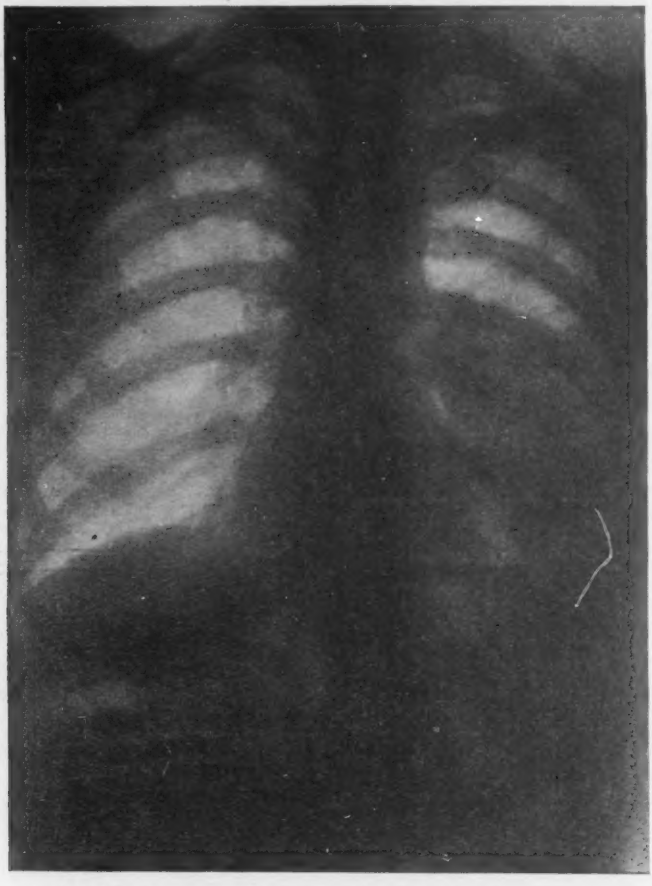


Fig. 4. Same case as in Figure 3, after operation.

signs promptly cleared up, her temperature falling to normal, and her patch of crepitation disappearing. I believe that this is the mode of origin of these lung abscesses. If she had not coughed up her septic foreign body, the process would have gone on and

become an abscess. The blood clot was certainly inspired during or shortly after the operation.

The third argument deals with the operation of the motors themselves. Many anesthetists, both by letter, in print and by word of mouth, have pointed out to me that the motors do not produce any pressure whatsoever. Now, I may be lacking in intelligence, but I cannot understand what their purpose is, unless it is to keep ether gas in the upper respiratory passages ready for inhalation by the patient. And, furthermore, it is difficult to see how this can be done unless pressure is exerted on the gas. If they produce no pressure, why are they used at all? Why not use drop ether? The question admits of only a partial experimental solution. I have attempted to devise some experimental method of proof without great success. But, anyone may subject himself to a personal determination of the matter, by putting the catheters in his nostrils, emptying the ether bottle and turning on the motor. I have several times done this with various motors, and am prepared to state that the pressure is positive; that in some of the new large motors it is very great and forces air not only into the posterior pharynx, but also into the trachea itself. Colored powder sprayed into my throat was later coughed up in the bronchial secretion. In many of the motors the pressure is uneven in its force, so that at times a great gust of air is suddenly forced past the glottis. It is these gusts, particularly, which may force an accumulation of pus, infected blood and mucous into the trachea. And I am still convinced, even more so by the accumulation of cases since my first report, and my experiences under these motors, that they are a very real source of danger, and should be very carefully watched if used at all.

Of course, inspiration of septic material can occur without the use of anesthetic motors. The fact that cases of lung abscess occur in which they are not used does not necessarily mean that they are not a contributory factor, in the cases in which they are used. The essential thing is, of course, the inspiration of septic material.

Doubtless, however, cases of abscess have occurred in which a motor driven anesthesia apparatus was not used. The literature is usually not specific upon the matter. If so, there must be another cause. It may reside in the fact that tonsil operators can infect the whole chain of lymph glands by swabbing around in the bed of the tonsil after removal. This bed is an open wound and the material which has been removed is septic material. Furthermore, the mouth is a septic cavity. The dangers of infection under these circumstances are very great. The question arises whether the lymph

glands which drain the tonsil can carry infection to the lung. It has long been supposed that the tonsils may be the primary focus of pulmonary tuberculosis. However, anatomical proof of the continuity of the cervical glands with the apices of the lung is lacking. They have not been followed to the lung. Gröber, by injecting India ink in the tonsils, recovered it from the lung apex. Many clinical

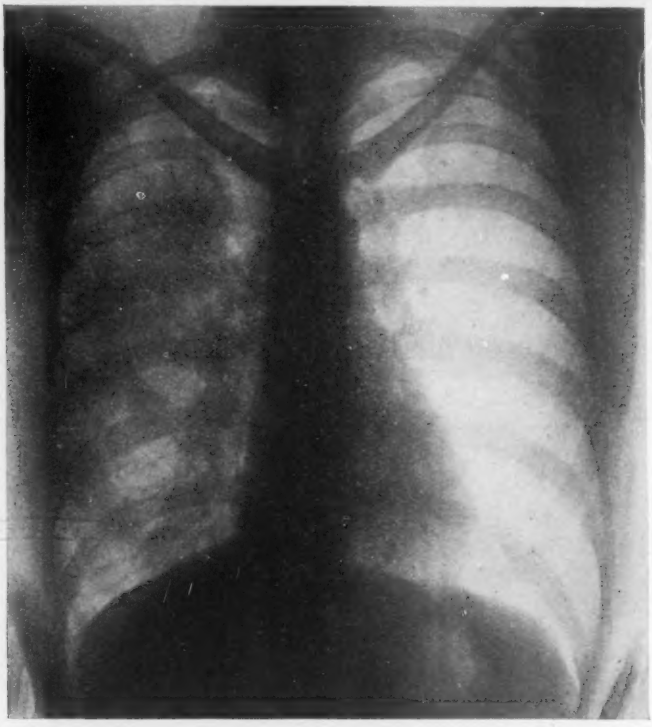


Fig. 5. Mediastino-pulmonary abscess following tonsillectomy. Right side. Motor-driven anesthesia apparatus used. Patient ran afternoon temperature and leucocytosis for 6 months following operation.

considerations lead us to believe that the relation does exist. If so, we have a second explanation of lung abscess following tonsillectomy, in the continuity of lymphatic tissue from an infected wound in the throat to lung tissue. When secondary hemorrhage occurs the possibility of infecting the raw surface in packing and otherwise attempting to stop the bleeding is correspondingly great and Coakley[9] reports a case of lung abscess following a hemorrhage.

One case occurring on service at the City Hospital has been very suggestive of another mode of infection by systemic involvement, via the lymph channels. The patient, a woman of 30 years, had a tonsillectomy performed under local anesthesia, by a doctor in his office. Seven days later she developed a mass under the angle of the jaw on the right side, which broke down with fetid suppuration. Her temperature was very irregular, septic in type, and accompanied by chills, as many as five in one day. On the 18th day a patch of intense crepitation with dullness developed in the base of the *left* lung. Several blood cultures were negative. Later she developed a phlebitis. The autopsy showed multiple abscesses, double empyemata and a pericarditis. This case suggests the first one reported at the Academy of Oto-Laryngology referred to above. This possibility, *i.e.*, of lymphatic infection carried to the lung was discussed in my original paper, as a second mode of abscess formation.

I am anxious to call particular attention to the fact that in my original article I was very careful to choose my words and that the most I said was that these machines "*may* be the cause" of the inspiration of septic material and hence of lung abscess. My critics have pointed out the advisability of the proper position of the patient during anesthesia, and of other methods of preventing such inspiration of septic material. Of all such criticism, I am very glad because I believe that the *central feature of the problem is the recognition of the fact that lung abscess is caused by the operation; that something in the technique of the operation is responsible for it, and that laryngologists should earnestly set themselves to try to prevent it.* If they can do so by exercising different or more careful technique, or by the more rigid application of already recognized principles, I shall feel that the discussion has been worth while. If they simply renounce an endeavor to use larger and stronger motor driven anesthesia apparatus, that also will have been worth while.

The treatment of lung abscess is not particularly satisfactory. The drainage of the abscess by surgery, resection of a rib, and subsequent stitching of the pleura, and later, at a secondary operation, drainage of the abscess, has not given very good results, either by resolution of the pulmonary infection, or improvement of the general condition.[10] The result of such work may be seen in the radiographic plates here reproduced (Figs. 3 and 4). The shadow after operation is really larger than before.

The best procedure is by artificial pneumothorax. Wessler[11] condemns it, but absolutely without reason, and without having a single case to support his opinion. Tewkesbury,[12] on the contrary, has a

splendid series of cases, now 19 in number, out of which 16 were cured and 3 died. They were all lung abscesses, following nose or throat operations. This demonstration leaves no doubt that this is the method of choice. I have done it once successfully and have seen another case. A glance at the plate (Fig. 19) will show that all the elements for a successful pneumothorax are present; an infection confined to one side of the chest, a free pleura, a severe and otherwise undrainable suppuration.

REFERENCES:

1. MANGES: *Am. J. Surg.*, 30:78 (March, 1916).
2. RICHARDSON, C. W.: LARYNGOSCOPE, 26, 1001, July, 1916.
3. LEWIS: International Clinics, Series 28, Vol. II, p. 84.
4. CLENDENING: *J. Am. Med. A.*, Vol. 74, p. 941 (April, 1920).
5. CORRESPONDENCE: *J. A. M. A.*, Vol. 74, No. 16 (April 24, 1920); and WALKER: LARYNGOSCOPE, Nov., 1920.
6. BASSIM: These de Paris, 1913, No. 181.
7. Personal communication.
8. Personal communication.
9. COAKLEY: LARYNGOSCOPE, 26: 1008 (July, 1916).
10. ERDMAN: *J. A. M. A.*, Vol. 73, No. 4.
11. WESSLER: *J. A. M. A.*, Vol. 73, No. 26, Dec. 27, 1919.
12. TEWKESBURY: *New York Med. Jour.*, Nov. 22, 1919.

Rialto Bldg.

THE DIAPHRAGMATIC PINCHCOCK IN SO-CALLED "CARDIOSPASM."*

DR. CHEVALIER JACKSON, Philadelphia.

There can be no doubt that a number of different pathologic conditions have been in the pre-esophagoscopic days classed under the loose and erroneous term "cardiospasm." The esophagoscope enabled the author[1] to demonstrate that the stenosis is not at the cardia; and Mosher[2] has recently demonstrated by anatomic studies that the stenosis is by no means always spasmodic. Mosher's anatomic observations of the liver tunnel and of disease of the abdominal viscera, especially the liver, as factors in the disease called "cardiospasm," have been confirmed by the clinical observations of Iglauer and others, including myself.

There are cases, however, in which the stenosis is, by esophagoscopic observation, quite obviously spasmodic, though local or re-

*Abstract of a lecture delivered at the University of Pennsylvania, Graduate School of Medicine.

mote lesions may incite the spasm or local stenotic lesions may be secondary to a static esophagitis resulting from a preceding spasmodic stenosis.

Out of hundreds of cases of so-called cardiospasm, the author has seen none in which the spasm at the hiatus was any greater that what might be called a maximum normal.

The Diaphragmatic Pinchcock. The pinchcock action of the periesophageal diaphragmatic structures, especially the sphincter-like prolongations of the crura demonstrated by the author to coexist with a kinking of the abdominal esophagus[3], undoubtedly accounts for the fact that a man may stand on his head after drinking a quart of water, or eating a full meal, without any of the stomach contents gravitating out of the stomach into the esophagus, and, indeed, without the acrobat experiencing any subjective sensation of the mechanism by which the gastroesophageal communication is so tightly closed to retrograde leakage. More remarkable still is the fact that a man may, with a stomach nominally full of liquid food, assume a position with the mouth much below the level of the stomach, swallow liquids against gravity through an esophagus steeply slanted upward, adding to the fluid in the stomachal reservoir without any of the stomachal contents escaping. The efficiency of this normal combined pinchcock and kinking closure against regurgitation is wonderful. In going down the esophagus with the esophagoscope the pinchcock action is so manifest, and so manifestly at the hiatus, as to admit of no dispute. This pinchcock action is evidently normal, and evidently, also, it is momentarily relaxed by the co-ordinate deglutitory mechanism with every normal swallowing act and with the somewhat less well co-ordinated act of emesis. It seems logical to attribute some cases of phrenoesophagospasm to disorder of this co-ordinated innervation, that prevents normal relaxation of the pinchcock at the proper moment in the deglutitory cycle. It seems logical to suppose that the dilated, strongly pulsating, thoracic aorta so frequently associated with phrenoesophagospasm might be due to a minor degree of pinching of the aorta by the crura of which the hiatal pinchcock is the prolongation. This is purely conjecture with only the frequent clinical association of the dilated aorta, with the phrenoesophagospasm to support it. The kinking of the abdominal esophagus between the stomach and the diaphragm is not so clearly demonstrable as the hiatal pinchcock, and requires the support of theoretical and of cadaveric experimental data to demonstrate its existence. The

few times that the reviewer has passed the esophagoscope or gastroscope into a full stomach seemed to show the straightening of a kink the moment before the outrush of stomach contents through the endoscopic tube. But the bias of preconcieved ideas on the subject could not be eliminated from the observation. At none of the innumerable examinations of the abdominal esaphagus, when the stomach was nominally empty, could a kinking be demonstrated; but, as the kinking is caused by stomachal distention, or at least by the pressure of a less quantity of stomach contents threatening to escape, it is not to be expected to be present in the completely collapsed stomach. Nor, is it likely that the downward passage of the esophagoscope would demonstrate kinking as it probably exists in

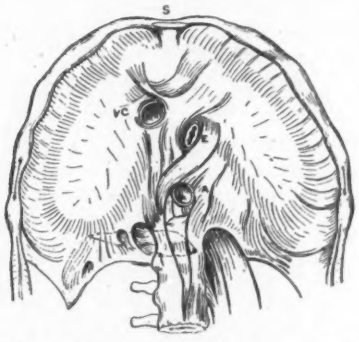


Fig. 1. The under surface of the diaphragm. What the author has called the "diaphragmatic pinchcock" is shown at E. The muscular and tendinous prolongations of the diaphragm surround the esophagus so as to form a typical pinchcock. This pinchcock normally closes the esophagus and opens it at the proper moment in the deglutitory cycle. In the author's opinion, based on esophagoscopic observations, it is the failure to open and not any excessive spasm that is the chief etiologic factor in many cases of so-called cardio-spasm.

the prevention of a retrograde movement. Retrograde esophagoscopy has also, so far, been rather barren of results in these investigations, as to kinking, though affording a beautiful demonstration of the pinchcock action. That the just-mentioned normal pinchcock action of the periesophageal diaphragmatic structures when exerted as an abnormal spasm can, and does, produce a spasmodic stenosis of the esophagus, is abundantly supported by esophagoscopic observations in hundreds of cases. To these cases the term phrenoesophagospasm is justly applicable. In a number of these cases a source of reflex can be found, and its elimination will cure the patient, as soon as nerve-cell habit can be overcome. In a number

of cases of shell shock, grief, fright, prolonged anxiety, overwork and the like have supplied the basic neurotic factor. The author has thought that, once stasis is started, there may be a spasm excited as a protective measure of the stomach against the entrance of the irritant, acrid, fermented food. As observed by H. K. Pancoast, there is a very remarkable coincidence, in the cases of so-called cardiosopasm, in the occurrence of the initial symptoms at about 12 years of age. Since Dr. Pancoast called his attention to it, the author has corroborated this observation in a number of instances. This raises the interesting etiologic question of adolescence, either with or without an endocrine phase.

CONCLUSIONS.

1. The diaphragmatic pinchcock is the normal mechanism by which, along with kinking of the esophagus, the food in the stomach is prevented from regurgitation.

2. The diaphragmatic pinchcock opens at the proper moment in the deglutitory cycle.

3. It is the failure of the diaphragmatic pinchcock to open normally that constitutes the stenosis in so-called "cardiospasm," and not an excessive degree of spasmodic contraction.

4. The diaphragmatic pinchcock is the local mechanical means by which the esophageal stenosis is produced in those cases of so-called cardiospasm, in which the condition is really a spasmodic one.

REFERENCES:

1. JACKSON, CHEVALIER: Tracheobronchoscopy, Esophagoscopy and Gastroscopy, 1907.

2. MOSHER, HARRIS P.: Proceedings Amer. Laryngol. Assn., 1921.

3. JACKSON, CHEVALIER: Tracheobronchoscopy, Esophagoscopy and Gastroscopy, 1907; also Peroral Endoscopy, 1915.

128 South Tenth Street.

THE NEW YORK ACADEMY OF MEDICINE.

SECTION ON OTOLOGY.

November 11, 1921.

(a) Case of Bilateral Mastoiditis, Complicated by Encephalitis Lethargica. (b) Case of Acute Tempero-Sphenoidal Brain Abscess, Following an Acute Mastoiditis. Dr. Ralph Almour.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

Case of Intradural Cerebellar Abscess, Complicated by Acute Labyrinthitis. Case of Labyrinthitis Complicating Chronic Mastoiditis. Dr. Alfred A. Schwartz.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

Case of Chronic Purulent Otitis Media Complicated by Perisinal and Extradural Abscess, with Severe Meningeal Symptoms. Case of Tempero-Sphenoidal Abscess Complicating Chronic Purulent Otitis, with Spontaneous Rupture and Hernia into the Mastoid Antrum. Dr. D. S. Dougherty.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

"Case of Sinus Thrombosis with Exploration of Bulb." Dr. J. L. Maybaum.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

"Case of Sinus Phlebitis with Normal Middle Ear at Time of Operation." Dr. Isadore Friesner.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

"Case of Brain Abscess in a Syphilitic." Dr. Truman L. Saunders.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. DENCH said there had been such a wealth of material presented that it was rather difficult to know where to begin the discussion. All the material had been so well presented that there was little left for any one to add. Every point had been very thoroughly covered.

He had, however, been particularly interested in Dr. Saunders' case, for he had seen it, and it presented some very interesting features. In addition to the aphasia, there was also a four plus Wassermann reaction, and it was difficult to say whether the man might not be also suffering from a broken down gumma.

Some years ago he had reported a case of a superficial brain abscess in a syphilitic woman, and it was not certain at first that this case also was not specific in origin. He agreed with Dr. Saunders that the good result obtained was probably due to the small amount of interference. One should go in as quickly as possible, then get out and stay out. If one treats cases in this way he will probably have much better results than were obtained in the earlier days of brain surgery when it was thought necessary to remove every possible part of a brain abscess. These patients have a collection of pus in the brain cavity, and if that is let out quickly with very little traumatism they are very much better off; nature will slowly collapse the cavity and heal it. Speaking from his personal experience, Dr. Dench said he feels very sure that in the earlier days he did too much energetic brain surgery, and that he would have had better success if he had simply evacuated the abscess, put in a drain, and let it alone.

Dr. Friesner's case of sinus thrombosis was very interesting, but he could hardly conceive of a middle ear process going on for such a length of time and the antrum being found normal on being opened. * * * Following the course which this case pursued, it should be remembered also that without cutting off the focus of suppuration, and without operation, many of these cases are probably unrecognized and do recover. Dr. Dench said he was not saying that one should not operate, for in this case the operation was the turning point that saved the patient's life; but we do find cases which run this course, are not operated upon, and clear up. With reference to the practically normal ear on inspection, perhaps Dr. LeWald might remember a case seen with him during the influenza epidemic in which a child had a sudden rise of temperature to 106° following a mild earache ten days before. When Dr. Dench saw this case there was only a little redness along the malleus handle, no earache, fair hearing and a little frontal pain, making one suspect a frontal sinusitis. The next day the temperature was normal in the morning, but the laboratory reported a positive blood culture, while the X-ray showed a cloudy mastoid. The mastoid was opened and found softened, and the internal jugular vein was excised and the sinus opened and a parietal clot evacuated. The temperature never rose after the operation. Fortunately the case was operated at just the right time.

The operation described by Dr. Friesner was a very good one. Dr. Norval Pierce thought of that several years ago. It saves the facial nerve every time.

Referring to Dr. Dougherty's cases, Dr. Dench asked whether in the case of brain abscess there was pus found, or was it simply a hernia cerebri. He had himself seen nothing of the kind.

Dr. Schwartz's case of cerebellar abscess called to mind a case seen at the Eye and Ear Infirmary some years ago. The patient was an old man who had been operated upon for a mastoiditis and he became very disagreeable and most of the staff were inclined to regard him as a neurasthenic. Dr. Dench finally examined him, and found that he was actually suffering, and explored his cerebellum, but found nothing excepting a collection of turbid fluid. That was evacuated, and the man's condition cleared up and he became perfectly happy and was walking about a week after the operation.

With reference to the case of labyrinthitis, Dr. Dench suggested that it would be better if the men in reporting these cases would simply give the deviation from normal instead of reporting every detail, as it would be easier to retain the condition in mind when discussing it. There was one point to be remembered in reference to over-pointing. Many men in examining the ear cases with neurological symptoms are more and more impressed with the fact that there is a considerable deviation in over-pointing that has not been explained. In a normal case, these deviations do not occur, but there is a very large proportion where there has been a suppurative process in the ear which gives rise to abnormalities that apparently do not mean much; that can only be explained by some little interference. It is only when there is a marked interference that one can make a definite diagnosis as to the localization. Over-pointing has been used too much as an indication for operation. Dr. Dench said he had been moved recently to utter a warning to disregard slight abnormalities in over-pointing. It means something, but not necessarily that the patient has a severe intracranial lesion. The interference may come about in several ways.

Dr. Almour's case of encephalitis lethargica was very interesting. Many men have made mistakes about that kind of case. The case cited was most interesting and the doctor was to be complimented on his careful differential diagnosis and the masterly manner in which the case was presented.

Dr. A. Braun said he had enjoyed listening to the cases; they were all interesting and well presented. The first case presented by Dr. Schwartz was particularly interesting, for the sequence of events was

rather unusual—a lesion in the cerebellum followed by labyrinthitis. A large proportion of the cases of cerebellar abscess are the result of labyrinthine disease. Collections of pus in the location described by Dr. Schwartz are often due to saccus empyema. Dr. Schwartz spoke of facial paralysis following some time after operation. Does he think that it was due to the cerebellar lesion or to the operation?

Both cases presented by Dr. Dougherty were interesting. The post-operative course in the first case was not at all in accord with the laboratory findings. Dr. Braun said, as he understood the case, there were a large number of cells in the spinal fluid and a considerable number of extracellular bacteria, yet the patient apparently got well in a week or two. He himself had never seen anything like that. Such a spinal fluid usually means a suppurative meningitis. Referring to the second case, of hernia into the mastoid antrum, Dr. Braun said that he had a somewhat similar case in which the outcome was not so favorable. The patient was a young woman in whom at the mastoid operation an epidural abscess was found in the middle fossa. Two months after the operation, she went into coma and showed all signs of meningitis. A second operation revealed an area of erosion of the dura in the middle fossa and there was a slight hernia of the brain. The brain was explored for an abscess, and none was found. It was thought that the woman would die in the next day or two, but after remaining comatose for 48 hours, she regained consciousness, and all the meningitic signs disappeared. She did well for a week, and then went into coma again. She was again operated, and it was found that the hernia had increased in size. Nothing was done this time excepting to clean out and pack the wound, and she again improved. Immediately after the operation she regained consciousness and the temperature went down. She remained well for two or three days, when she again relapsed into coma and finally died. These cases have been described by the Germans as intermittent meningitis.

Dr. Maybaum's case was also exceedingly interesting. Dr. Braun said he had performed the operation described on five cases in the last seven years. It was a very simple operation. One point to which Dr. Maybaum had not referred was very important, the spur of bone behind the upper part of the bulb must be removed. This can be done with a rongeur or a curette. It is perfectly safe as far as the facial nerve is concerned, and the operation can be done very easily in five to ten minutes. Dr. Braun agreed with Dr. Maybaum that this operation should be done in practically every case in which there is no return flow from below.

Dr. Friesner's case of sinus thrombosis was easy to understand. Dr. Braun said he had a case a year ago in which he was firmly convinced that the thrombosis was not due to the mastoid. The patient was the child of a doctor. His illness began with the measles. This was followed by cervical adenitis on the right side. The child then developed an acute ear on both sides and began to run a septic temperature. A blood culture was taken by a pathologist in Mt. Vernon, who reported staphylococci. The child was then sent down to New York and hemolytic then performed, revealing a moderately involved mastoid. The sinus was opened and a thin clot was found. On going into the neck, it was found that the glands were completely broken down and the internal jugular vein was bathed in pus. The entire vein was filled with broken-down purulent material. The process extended down into the chest. This was undoubtedly a case which the thrombosis in the sinus was secondary to the jugular vein thrombosis, as the process in the jugular vein in the neck was much further advanced than the process in the sinus.

Dr. Eagleton inquired in what respect the operation referred to by Drs. Braun and Friesner differed from the original Grunert operation. Grunert published his monograph in 1899. Grunert insisted on taking down the posterior lip, which is the only difficult part of the operation.

Dr. Eagleton said that when he was in Vienna, they had a large number of these cases. The only point they have added is the taking of a separator and separating the periosteum, and this had also been done in a large number of cases by others. Grunert took that as a matter of course.

DR. MAYBAUM said that the Grunert operation, as he had previously remarked, was more radical and formidable than the improved technique, for which, by the way, the name of Friesner had not been claimed. He had expressly stated that Grunert, Voss and Tandler had done the bulb operation many years ago. Dr. Friesner had just referred to the fact that Dr. Braun had done a somewhat similar operation. Dr. Braun may recall a case of Dr. Maybaum's a few years ago, of sinus thrombosis (Dr. C.), where, as a result of Dr. Braun's intervention, continued sepsis from the bulb was relieved. This was a far more radical operation, following the technique of Grunert with a resulting ugly scar reaching from the upper pole of the ear to the sterno-clavicular joint.

Dr. Maybaum agreed with Dr. Eagleton that the Grunert operation is a far more radical operation than the simpler technique suggested by Dr. Friesner. The Grunert operation not only follows the sigmoid groove to the bulb, but removes the posterior wall of the bulb. The 9th, 10th and 11th nerves emerge from the skull through the jugular foramen. In working along the base of the skull near the jugular foramen there is some danger of injuring these nerves while doing this operation. This procedure is often quite difficult; furthermore, there is a possibility, if carried up too high towards the roof of the bulb, of injuring the posterior semi-circular canal.

DR. BRAUN said the main difference between the Grunert operation and that described by Dr. Maybaum was that Grunert enters the bulb from the outside of the skull, and in the other it is approached from within the mastoid cavity.

DR. EAGLETON said that was the difficult part of the Grunert operation. We ought to remember the men who contributed this work, and though he was glad to give all due credit to American otologists, he could not see that anything had been added except when you get to the hard part. It was very simple to go down to where the bone was. It was through that, just before you enter the jugular bulb, that the operation stopped. It was an incomplete Grunert operation, so far as he could make out. He was glad to hear the explanation, for he wished to know just wherein it differed from the Grunert operation. Grunert's monograph was of great value and it would pay every one to read it through, * * * but it is very difficult if you try to freely open the lip before you come to the bulb.

Dr. Eagleton complimented Dr. Schwartz upon his report on the case of cerebellar abscess and said that such a report was of great value. There are in the records of medicine but six cases of complete vestibular reactions in cerebellar abscess—for he had searched them through. He would like to add this as the seventh, and he had two more of his own which he would present some time. The only way we will ever be able to understand vestibular reactions is to report them as Dr. Schwartz had done. Dr. Schwartz had stated that we make no effort to explain the (literary?) findings. There is an explanation, but it will never be found by writing that such and such a tract should be altered by such and such a lesion. It does not occur in surgical lesions, such as fine hemorrhages, but in abscesses we have gross lesions which upset all the theories. One person says the way to tell the difference between cerebellar abscess and one in the labyrinth is that the falling is always in one direction in a cerebellar lesion, no matter how the head is turned. There are three cases on record in which the falling (one had two and another one). * * * Although there is a great deal in the vestibular reactions, we should not place as much reliance on them as we have been doing.

DR. KOPETZKY said he regretted to introduce a slightly discordant note in taking up the question proposed by Dr. Maybaum in asking a dis-

cussion of the indications for the bulb operation. If he understood correctly what had been said by Drs. Maybaum and Friesner, they contended that the bulb should be thoroughly cleansed and opened up by this procedure in every case in which a clot extended to the bulb. Then they ligate the internal jugular at the level of the omopyoid.

Speaking from a personal experience with forty-three cases of lateral sinus thrombosis with ligature or resection of the jugular vein, Dr. Kopetzky said that he had found it necessary in only two cases to go into the bulb, and in both these instances he had done so, not because of his own wish or for any logical reason that appealed to him, but because other men on the case with him advised it, and because, postoperatively, sepsis persisted, and it seemed wiser to do something than to simply stand by and wait. In both of the instances referred to, sepsis persisted after the bulb operation just the same.

The indications for a surgical operation should be definite and logical, designed to accomplish a definite result which could not be attained in any other way, and the results claimed for a procedure must justify it.

Arbitrarily, if one removes the clot from the bulb upward and backwards beyond the knee as far as necessary and can only reach the bulb poorly at best, and then one goes down into the neck and puts a ligature around the internal jugular, there remains a sac of blood and clot extending from the bulb downward to the point of ligature in the neck, and whether one opens into the bulb or not, this sac remains in situ with its blood and clot, infected material which is not removed, whether one opens into the bulb or limits one's procedure to just the entrance of the bulb. Therefore, what is gained by opening into the bulb? If Drs. Maybaum and Friesner contended that by this procedure one removes all the septic material, then, Dr. Kopetzky thought, there might be some logic in it, and it certainly would be a logical procedure if one took the end of the jugular vein, after incising it, and brought it into the edge of the wound in the neck and washed through to the bulb, as one formerly did. Leaving the vein intact, however, and only ligating it, there then remain, from the bulb to the ligature, even after the procedure advocated by Dr. Maybaum, infected blood and clotted material, as stated above.

The statement that one removes infected vein from in contact with the cerebellar dura answers an objection that is more theoretical than practical, since one-third of the vein wall is dural covering of the cerebellum—and one must leave that in situ or one would open the cerebellar fossa.

Dr. Kopetzky agreed that the bulb operation, with the technique as worked out by Drs. Friesner and Maybaum, was a nice surgical procedure, with less trauma to the patient and less resulting scar than in the Grunert procedure, but as yet the indications for it do not seem to eb well established.

DR. MAYBAUM said that much of what Dr. Kopetzky had stated was undoubtedly true. He did not agree with Dr. Kopetzky that exploration of the bulb was unnecessary. The operation referred to simply consists, if you will, of doing the sigmoid sinus operation more thoroughly. It is not unusual to find operators following the lateral sinus back to the torcular, performing a number of such operations to relieve sepsis, and yet, not attempt is made to clean out the bulb. There is no question that many patients with a clotted bulb recover without doing more than the usual sinus operation. Some, however, continue to run septic temperature in spite of a thorough sinus operation. Some of these cases may be relieved by the simple procedure of completely cleaning out the bulb. Sepsis from a bulb thrombosis may be obviated by a simple exploration of the bulb at the time of the sinus operation. It is conceivable that one may see jugular bulb thrombosis followed, if one waits long enough, by the development of a cavernous sinus thrombosis by extension of the clot through the inferior petrosal sinus. Dr. Maybaum said that he had had such an experience some years ago. A boy twelve

years old came to the Manhattan Hospital with a history of high temperature and chills, and mastoid involvement. He operated upon the lateral sinus and found an obturating clot, and stopped short at the usual distance from the bulb. There was no bleeding from the jugular bulb. Two days later the boy developed classical symptoms of cavernous sinus thrombosis. Dr. Maybaum said that he was not prepared to state that had he operated upon the bulb originally, the cavernous sinus thrombosis would not have followed, but he never felt sure that he had done his best by the patient.

DR. FRIESNER said that he had made no claim that this bulb operation was original with him. He had not added anything to the technique in any way that gave him any rights of priority. The operation had been shown to him originally by Dr. Braun, and he had shown it to a number of other men—Dr. Rae, Dr. Duel, etc. He himself had simply added a few refinements in technique, but nothing to permit him to lay any claims to the operation.

DR. DWYER, referring to Dr. Kopetzky's remarks, said he had followed the bulb operation for the past few years, but could not see any necessity for going into the bulb in the majority of cases. As Dr. Kopetzky had said, leave the infected matter in the bulb and drain.

Referring to Dr. Almour's cases, Dr. Dwyer said he did not think the Section should allow the differential points about the various forms of meningitis and the spinal fluid findings to go unchallenged. He did not believe that the examination of the spinal fluid would differentiate serous meningitis, meningismus, lethargic encephalitis, purulent meningitis, etc., from each other. He had himself worked for years on spinal fluids and could draw no such conclusions. He was sure Dr. Eagleton would agree with him, as they had thrashed that point out many times. In other respects, the doctor's report was excellent.

In regard to Dr. Dougherty's case, Dr. Dwyer expressed the opinion that if more of the spinal fluid had been planted out the organism would have grown. He had experienced such difficulties himself. He thought that with the organism present in the spinal fluid the case should be described as purulent meningitis complicating mastoiditis with severe meningeal symptoms. Dr. Dougherty was to be congratulated, as the recovery of such cases was very rare.

Referring to the findings of the bloody spinal fluid, Dr. Almour said that he was giving the report of the laboratory. As to the differentiation of meningismus, serous meningitis, and meningitis sympatica, etc., he did not personally feel that there was any definite conclusion to be drawn from the spinal fluid in each condition. It was true that each one might be the subsequent stage of the others, but where the meninges are involved by some infecting condition, and in the serous meningitis where there is an exudate of serous material into the spinal fluid one can see by a lumbar puncture an increase of spinal fluid in pathological changes. He has seen quite a number of cases with absolutely normal spinal fluid in regard to pressure, etc., in meningismus, and two cases of meningitis sympatica where the characteristic fluid was present.

DR. SCHWARTZ, in answer to Dr. Braun's question, said that the facial palsy had occurred nineteen days after operation when the patient was doing splendidly. The facial canal was probably eroded by the cholesteatoma. The condition cleared up very rapidly.

DR. DOUGHERTY, replying to Dr. Dwyer's strictures on the findings, said that he was not a pathologist, but merely a surgeon, and the case had been reported as found clinically and on operation, a case of extra-dural abscess with severe meningial symptoms; in fact, a case of pachymeningitis. The pathological findings were reported by Dr. John H. Larkin of the College of Physicians & Surgeons, Director of Laboratories in the Department of Charities. He agreed with Dr. Braun that the outcome had been most fortunate; both cases should have died, but unfortunately did not, as would probably have happened in the case of private patients. The case of the young girl was typical of what happens in the City Hospital; they do not let the patients wait for three

or four consultations, laboratory examinations, X-ray pictures, etc., but operate on them as soon as the ambulance brings them in. In this way a large proportion of them get well.

DR. FRIESNER, referring to Dr. Dench's statements, said that he had, some time ago, seen a case operated in which the ear discharged for over two weeks following a second myringotomy. A primary thrombosis occurred in the bulb, with precisely the same findings, with apparently normal mastoid, normal mucosa apparently in the antrum, a normal sinus plate with glistening covering of the sinus, and a firm clot in the lateral sinus. As for the indications for operation, it would seem that with a sinus full of pus, an operation was justified. Dr. Friesner said he did not suppose that Dr. Eagleton would hold him responsible for the vagaries of Newark physicians. He had read Grunert's technique and had simply made some modifications, so that it was a simple method for doing rapidly a complete sinus operation as had been described. Stopping at the posterior end of the horizontal part of the sinus was not a surgical procedure, as it left an infected clot with an infected vein wall in contact with the dura. Dr. Friesner said he had constantly and persistently ligated veins for the last fifteen years and had never had any complication following, excepting a local abscess in the neck. The important thing was to get the infected clot and vein wall away from the dura, and the complete sinus operation did that. He was well aware that the lip was the point of contention; that was the most difficult part of the Grunert operation, but he had performed it between 30 and 35 times on the cadaver and knew that in many instances one could get a good exposure of the bulb by this method without taking away the lip. With this comparatively simple technique one could do the complete sinus operation from behind the infected clot through into the bulb and pack into the bulb. In this instance he had demonstrated at the dressing that he could look into the bulb, and in no case had he touched the lip. It was not kind to call this the Grunert, Friesner, Maybaum operation. He laid no claim at all to the technique, and he had stated so very definitely.

Dr. Friesner said he wished to reiterate that without touching the lip * * * any one, in five to ten minutes at the outside, could do a complete operation—not an incomplete one. He had never meant to suggest that the bulb operation was not necessary. Dr. Kopetzky was mistaken if he thought he could put the curette in the bulb by the usual exposure. This complete operation, however, would expose the bulb in such a way that one could (open) it without taking away the lip. That was his experience with the cadaver, and it was based on an experience of over thirty cases and he was sure of what he had seen.

SECTION ON RHINOLOGY AND LARYNGOLOGY.

November 23, 1921.

"A New Nasal Suction-Irrigation Apparatus." Dr. John M. Lore.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. HURD said the idea might well be worth while. Several years ago he had himself tried out another principle for the same object but it did not work very well; the ten or twelve inches of vacuum was very disagreeable to the patient, and it was discarded. Later the Nichols' douche came out with the same principal. With Lore's apparatus the patient would probably tolerate the jet of water without discomfort.

DR. COFFIN said the apparatus was very ingenious and should be very useful.

DR. MCCULLAGH said he had seen Dr. Lore use the apparatus many times in his clinic and he had used it on himself experimentally. The results were very good and the treatment not unpleasant, as the other method is. He recommended its use.

DR. IMPERATORI said that he had used the apparatus in over ten cases and found it very successful. He had also tried it on himself and found that there were no unpleasant feeling—provided that the suction was not too strong.

The Nichols' douche was as good as anything that we have had—but there was, in Dr. Imperatori's opinion, considerable danger of fluid getting into the Eustachian tube. From the experience, so far this apparatus does not do this.

DR. LORE said that for home use the patients use the ordinary water pump.

Replying to an inquiry from Dr. Coffin as to whether it had been used on children, the Doctor said yes; after the first attempt they had taken very kindly to it. In clinical work they are frightened by the surroundings; but the parents say that at home they use it without any trouble at all. He had used it on children five years old with good results. In reference to ear complications as the result of the use of this apparatus, he had tried, at one stage, to force the flow into the ears, but could not do it.

In reply to Dr. Hurd, who said he had used a bilateral suction irrigation apparatus with poor results, Dr. Lore said that he had also tried what the Doctor suggested, but it did not work in all cases and very often it would be painful; but where you have an intermittent suction-irrigation with water and air, on one side at a time, you have eliminated the dangerous element.

Needles for Suturing the Pillars of the Tonsils Together. Dr. J. Eastman Sheehan.

The idea of using an instrument which would act as a tongue depresser and also to enable one to suture the pillars of the tonsils together was conceived some two years ago in Europe while experimenting with the epithelization of the tonsil cavity. There are two needles for suturing, one right and the other left. The small dip in the distal end of the shaft so pushes the tongue out of one's way that a firm, deep and low suture can be made with ease in the posterior pillar of the faucial tonsil. After the posterior pillar is pierced, the needle pierces the anterior pillar and brought out near the membrane of the alveolar eminence, thereby insuring one of a firm suture hold. The needle is then turned completely upon its own axis and by so doing the pillars approximate and the instrument locks itself in the tissues: a small tenaculum catches the thread from the eye of the needle, and the instrument is retired.

An Apparatus to Simplify the Removal of a Skin Graft of the Thiersch Variety. Dr. J. Eastman Sheehan.

The Sheehan-Kilner apparatus: The non-hairy portion of the skin is used in removing the graft, generally the front aspect of the forearm or the antero-inner aspect of the upper arm or the front and inner aspect of the thigh, etc. The method which is in general use today in removing such skin grafts is after the skin is sterilized and moistened with saline, two blocks of wood are placed, say, six to ten inches apart, transversely to the limb and the skin made taut by pulling the blocks of wood away from each other, as firmly as possible, the skin between being cut by a razor or Thiersch graft knife. The method is an awkward one, requires one to be well versed in the technique and, owing to the bellying of the skin between the blocks, many times results in a poor graft of uneven thickness.

The apparatus makes much easier the removal of the graft, is simple, produces the minimum amount of bellying of the skin and is quite reliable. The small cross bar teeth gives one a firm hold on the area of the skin to be used, a small amount of pressure from above pressing the bars apart produces even stretching of the skin; the ratchet locks the apparatus at the desired degree of tension, the instrument is steadied by the hand on the upper part, the other hand being used in cutting the graft.

A Set of Bone Chisels—No. 1, 2 and 3. Dr. J. Eastman Sheehan.

The smaller chisel, No. 1, is particularly used by me when I elect the external operation for the removal of a bony hump from the nose. It also has many other uses. The next size chisel, No. 2, is used in removing an osteo-periosteal graft from the tibia. Chisel No. 3 is used in removing an osteo-periosteal graft from the ilium.

The back side of the chisels are flat and smooth except at their distal ends, which are slightly curved, the front side of the tool has a sharp cutting surface. The object of curving the distal ends is for the purpose that when the graft is gradually removed from its host it breaks forward, making an even thickness graft, thereby insuring the minimum amount of mutilation of the base. In removing nasal humps the smaller chisel is particularly serviceable, as it is quite impossible to chisel deeply into the tissue, while otherwise one might remove more of the bone than is necessary.

Sheehan's Modification of Gillies' Suture Forceps. Dr. J. Eastman Sheehan.

The idea of combining a suture forcep which embodies the property of scissors and which enables one to tie was conceived from Kocher's fixation scissors of my old teacher, master and friend, Prof. Dr. Kocher, of Bern, Switzerland. Sewing up after a plastic operation many times takes as long as the surgical procedure itself, even in the hands of the experienced, so that any instrument which enables one to become more dextrous and smoothes his technique is not only time-saving to the surgeon but also are of outstanding importance for the sake of the patient. In using the instrument the no-touch technique can be nicely carried out in sewing up. One is able to suture, tie and cut without releasing the instrument from his grasp. The forceps have been so improved that a better hold is obtained from the long shaft and the needle is held more firmly by having the mouth of the instrument approximate more accurately.

A Set of Scalpels. Dr. J. Eastman Sheehan.

The scalpels are used by me in my plastic work. The larger ones are used for the making of tube pedicles, incisions for the removal of bone or cartilage and excising scars, etc. The other various smaller ones are used in the finer work about the eyes, nose, face and neck. The handles are purposely made stubby, to insure one of an easy yet firm and well balanced grip.

An Enucleator for Tonsillectomy. Dr. C. B. Meding.

Reviewing our experience with the various means and methods of enucleation we found the safest, quickest and most reasonable way was with a snare, and the Beck-Schenck tonsillectome was the best obtainable.

It proved, however, weak and structurally poor. The lock slipped, the screw skidded, the tips turned and the wires broke. Possessing ten instruments, we seldom had four in condition. Struggling with the defects, expense and daily breakdowns, we were reminded that tools for the trades are made by tool users while our instruments are seldom more than toys, even quality of material being often forgotten. To overcome these conditions I joined forces with a mechanic and inventor. A thorough testing of the result persuades me we cannot claim too much for the result. The tonsil enucleator is a last word so long as enucleation is desirable.

It consists of five simple parts; a barrel and screw finger-hold, fenestrated tip and loop. There are three sizes of tips and loops. The finger-hold is of bronze, the barrel screw of drill rod, the loops of spring steel, the whole heavily nickeled.

There are no thumb screws, no lock, no wire and but one spring. It is simple and clean. It can be disengaged instantly and reintroduced by the operating hand. The fenestrated tip and loop can be changed instantly. It fits the hand, is powerful and permanent.

When the tonsil is expressed, there is no jerk of released lock, but the steady pull on finger-hold finds a commensurate advance of the loop up to limit of finger strength—the barrel screw takes hold automatically and turned without slip or break, completes the operation. The loop is different from any dull blade or ring hitherto used, in shape and movement. The loop does not change in shape but moves concentrically between capsule and fossa, its flatness forcing a smooth separation.

To surgeons using the snare it presents no change in technique; to the beginner it presents correct mechanics, correctly applied. It is always ready, rustless and perfect. Once possessed there is no further expense for wire or repair.

To succeed in describing an operation so that the reader may become performer, the writer must assume every learner a beginner. Only thus can confusion by omission be avoided. The operator must acquire a technique. Certain maneuvers must accomplish definite results, must be executed despite irregularities and with practice become inclusive. To attain manual dexterity we do best to accept a definitely successful routine—with its prescribed fingering, performance and recovery and master it. Thereafter personal amendment may improve.

In the enucleation of an encapsulated body the separator should follow the line of structural division, and experiment with the tonsil proves this practical. It also shows that a pressure which straightens or evens the plane of cleavage permits the separator to find more easily this path of least resistance.

Now if we visualize the wire circle of a snare we note that the first pull straightens its sides and shifts all strain and force to the angle of the V; with the Meding loop, however, the tonsil body is gathered symmetrically and the separation is begun at a single point. There can be no question as to the superiority of this flattened rigid steel loop over the uncertainly behaving wire. The smooth shaven appearance of the emptied fossa beautifully illustrates this.

The pressure is made with the finger against the back of the tonsil through anterior pillar, extruding or breaking it through the fenestrated tip within which the loop hides. Success depends on the expressing finger. it must test the correctness of the size of the ring which must encircle the tonsillar mass, be it round, irregular, flat, buried or lobulated. Force alone often fails, besides unfitting the finger for the next case. The ring must be held forcibly, must include entire tonsil and must co-operate with the expressing finger. When the loop is drawn, the expressing finger should feel its advance and must not be relaxed until the loop reaches the limit of the pull (generally at first or second click of ratchet). During completion, strong dimpling of the anterior pillar will be observed. Two instruments decrease bleeding, shorten the operation and prevent a delay.

Cyst of the Mandible With Unusual Features. Dr. Irving Wilson Voorhees.

In October, 1920, R. H. M. came in for an opinion as to a swelling of the lower jaw which had been present for over one year. It began with toothache opposite the lower left canine and had been increasing very slowly until it presented a sizable mass, which could be seen by the casual observer twenty feet distant. There was also a persistent nasal discharge of yellow "matter" and frequent headaches.

An X-ray plate made by Dr. F. M. Law at the Manhattan Eye, Ear and Throat Hospital showed severe involvement of the right antrum. The left antrum showed a small cyst about one cm. square in its floor. A large swelling, probably a cyst, was present between the outer and inner tables of the mandible on the left side, extending from the lateral incisor to the first molar.

About ten days later the patient was etherized and the usual Caldwell-Luc procedure carried out on the right antrum. This sinus contained about a half dram of foul pus, many polypi and degenerated mucous membrane. Usual closure of oral incision and gauze packing of the sinus.

I then made an incision within the mouth over the mandible tumor extending from its posterior to its anterior pole. The bone was found to be thin as an egg shell and care was, therefore, used not to cut through it. Upon denuding the periosteum from the bone, the latter was found dehiscent over an area of about two square millimeters. Picking the bone away carefully with a mastoid curette, the wall of the cyst came clearly into view and it was possible so to work around it that it was not ruptured. The cyst was found attached to the apex of the canine or cuspid and in its growth had separated the outer and inner plates of the mandible, thus forming a smooth bed for itself. Going back to the history we found that a dentist had treated the first bicuspid adjacent to the cuspid tooth for some time and had then removed it. There seemed to be a slow tendency to heal after this extraction and the cavity was packed with gauze for some time. After I had removed the specimen intact and still attached to the apex of the canine, it was split open and to our surprise a piece of gauze was removed from its interior. Presumably this gauze had been lost by the dentist while treating the socket of the extracted first bicuspid. In reality he had been invading the cavity of the cyst. It seems remarkable that the wall of the latter had healed in and retained the foreign body. One would have expected a persisting sinus.

The cyst measures about 5½ cm. in length, and about 4 cm. heighth. The corresponding bone cavity filled in completely with granulation tissue in about three months, and the mandible seemed once more entirely normal. The bone was so thin preceding operation and for a long time afterward that even a slight trauma might well have produced a fracture.

DISCUSSION.

DR. HAYS said it was very important that the men doing rhinological work should appreciate the necessity of disclosing these cysts of the mandible. About six years ago he had performed a submucous operation on a patient who had excellent breathing until recently, when he returned. Transillumination showed the center a little dark, but not sufficient to warrant washing out. The man had a peculiar voice, and it seemed as though he had a slight paresis there. He had no history of syphilis, and the Wassermann reaction was negative. Three days later he returned again and nothing was found, and examination of the teeth was also negative; but he stated that when he massaged down over a bicuspid tooth on one side foul-smelling material oozed out. He was referred to a oral surgeon, who found a large dental cyst which had eroded the floor of the antrum and the nose. He was operated upon and a cyst was found filled with foul material. All the bone had disappeared.

Total Laryngectomy, Presenting Patient and Specimen. Dr. Charles Imperatori, New York.

This patient, R. S., aged 57 years, of Russian nativity, and a shoemaker by occupation, came to Bellevue Hospital, May 7, 1921, complaining of hoarseness and dyspnea. He had noted these symptoms for three months previously.

His family history is negative, as is also his past history, in so far as it concerns this report and is therefore omitted.

Examination of his larynx on the day of admission showed a whitish mass, irregular in outline, extending upward from the ventricular band on the right side anteriorly and over the lower half of the epiglottis down to and including the anterior part of the ventricular band on the left side. The growth was located so that the right cord was not visible. About one-half of the anterior portion of the left cord was seen. The size of the growth was about 2 by 3 cm. and occluded about one-half of the entrance of the larynx

According to Krishaber, this would be classified as an extrinsic growth. Biopsy was done to confirm the clinical diagnosis of epithelioma. Radiographs of his chest were negative. Wassermann was negative. There

were no glands palpable and from the special location of the growth it appeared to be a proper case for laryngectomy, these views being concurred in by Dr. Coakley.

Pathological report was that of an epithelioma.

A preliminary low tracheotomy was done on May 19, 1921, and following the method of Brewer and also of Crile, the trachea was well separated from the surrounding tissues, from the cricoid to the seventh ring; the trachea being separated by iodoform packing from the peritracheal tissues. A 12 mm. tracheotomy tube was used. The operation was done under ½ per cent novocain. Following this operation emphysema of the tissues of the neck appeared within four hours and it was several days before the emphysema disappeared.

The packing was removed immediately on appearance of the emphysema. Following the suggestion of Sebileau, it was decided to wait three weeks before performing the laryngectomy. During this period his teeth were attended to.

On June 9, 1921, assisted by the house staff, a laryngectomy was done. Rectal anesthesia was used, following the method of Gwathmey. There was practically no reaction following the operation and on the second day the patient was sitting up in bed, and on the third day was walking around the ward. His recovery was uneventful and in the latter part of July he left the hospital, reporting back to have his tube cleaned every three or four days.

The method of feeding was through a tube that was left in the esophagus continuously for the first week after the operation—the upper end of the tube was brought out through the nose.

The laryngectomy wound healed promptly, excepting the right upper end, where there was a discharging fistula until the middle of October. This I feel was entirely due to silk suture material that was used in approximation of the pharyngeal mucosa.

The tracheotomic wound never gave any bother. A large size tube is being used now than at the time of operation. The patient complained that he was not getting enough air and he would remove the inner tube and go around with the outer tube alone. These larger tubes are made by Tiemann.

Specular esophagoscopy during the latter part of September showed some granulations at the site of the attachment of the epiglottis. These were burned down with silver. Early in November these granulations having recurred, they were removed en masse and submitted for pathological examination. The report was that of granulation tissue and that there was no evidence in the tissue of any malignancy. This area has very likely at its base a silk suture that is acting as a foreign body. The success in using silk as a buried suture is in its proper sterilization.

The patient has gained weight and excepting for some slight stomach trouble, which is undoubtedly due to improper mastication of his food, not having any teeth, is in very good condition.

There is no evidence of any malignant condition being present in this man's body at this time. A general examination by Dr. Norrie confirms this statement.

This case is presented before the Section mainly with the idea that he may be recalled at some future time for observation.

Gross examination of the specimen shows the following: Extending upwards above the right cord and ventricular band an irregular shaped whitish mass about 2½ cm. in an antero-posterior diameter extends upward to the right glosso-epiglottic fold, across the cushion of the epiglottis and to within 2 cm. of the free border of the epiglottis, and then downward to the posterior third of the left ventricular band. The right cord cannot be seen—it being part of the growth; the anterior third of the left cord is visible.

The main root of attachment of the growth seems to be from the petiole of the epiglottis and to the right ventricle of the larynx. The growth occludes the lumen of the upper part of the larynx about one-half.

DISCUSSION.

DR. HURD said the man would learn to draw the smoke still further and would manipulate it in his throat. He would thus have the first lesson in voice culture. The next lesson would be to hold the chest wall still while smoking. From thereon it is a question of brain and fundamentals. Dr. Hurd said that some time ago he had showed a man before the Section whom he had taught first to use a cigarette; then stopped him from using his chest, and thereafter he kept at it until he learned to use his voice. That man now carries on his business perfectly well. There were only three sounds he could not use and he has to substitute different words which do not contain those sounds. Another patient could make the tone, but he will not stop the movement of his chest, so he wheezes.

Dr. Hurd said he had found that the long Jackson No. 6 tube was not big enough and he was now using 38-40 French. This man was using 37 now.

DR. MCCULLAGH said he had recently seen one of Dr. MacKenty's patients without any tube, and Dr. MacKenty told him that none of them now wear tubes. At the time of the operation he sews the trachea to the skin, and if proper union is obtained there is no necessity for a tube after the operation.

DR. DOUGHERTY said that many of those present might remember a patient shown by the late Dr. J. A. Bodine who wore no tube yet could whisper very distinctly so that he could be heard half-way across the room. He had never had any lessons. Dr. Dougherty then cited several other cases and said he thought that all of these patients could be taught to speak and many of them could speak themselves without much teaching if they would only persevere.

DR. EMIL MAYER said that Dr. Moschowitz showed a patient at this Section upon whom he had operated for malignancy and never introduced any tube at all. At the time of the operation the trachea was sewed to the skin. As for being able to speak, Dr. Solis Cohen showed before the Section perhaps the first case in which he operated and removed the larynx, and the patient was able to speak very distinctly.

He congratulated Dr. Imperatori on his splendid result in so short a time.

Typical Operation for Draining Abscesses, Etc. Dr. Otto Glogau.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. WOLFE FRUEDENTHAL said that while Dr. Glogau was reading his very interesting paper he was reminded of one read by Dr. Mosher a year ago at Newark on deep-seated abscess of the neck with thrombosis of the jugular vein. At that time he himself had remarked that when a tonsillar or peritonsillar abscess is opened, very little has been done for the patient, especially where an external swelling remained. Dr. Glogau had gone further and described the condition in the mediastinum The method seemed to be an excellent one, and he hoped later to try it.

He then cited a recent case, a woman referred by her physician to have a tonsillar abscess opened. Several incisions were made, and little pus found. But the woman felt easier and was sent home. Her general condition was poor; she complained of pain in the chest and could not breathe comfortably. The larynx was examined, but nothing was found, and there was no emphysema. Dr. Freudenthal said he did not think of the mediastinum, but called up the doctor and told him there was a swelling on the outside of the neck which did not correspond with the location of the tonsil, and he feared there might be the beginning of an angina Ludovici; since these conditions were very infectious the patient should be watched carefully. She returned the following morning with the swelling much larger and extending to the other side; the pain in the chest also extended to the other side. Some suspicious rales were found on the chest, and her physician was told that the infection was spreading rapidly, and she should be operated upon immediately.

The woman went to another physician, however, who gave her a gargle. The next day she went to a hospital, was operated upon, and died. The physician told Dr. Freudenthal later that the primary cause was from the left wing of the thyroid cartilage. That did not seem natural, for in these cases the infection does not travel up, but down. In half a dozen cases he had seen it was the same—from the retro-pharynx down—forming an abscess of the larynx, etc., etc. Whatever these cases may be, early diagnosis should be made and quick operation should be done.

DR. HAYS said that this important paper should not be allowed to pass without referring to the lymphatic drainage of the throat and nose. All the deep infections of these parts depend largely upon certain factors, the chief of which are: the virulence of the organism, the location of the infection whether they follow the loose areolar tissue of the neck, and the drainage of the tissues and tonsils. In all the cases referred to during the evening, there seemed no doubt that the infection had traveled through the lymphatic system and the lymph vessels had been infected.

As to whether it was necessary to perform such an extensive operation, he did not feel at liberty to say, excepting that he knew from personal experience that even when there was an abscess it was only necessary to make a neck incision and follow down until pus is reached. It was easy to imagine that with the lymphatic drainage such an infection could easily go into the mediastinum.

DR. DOUGHERTY complimented Dr. Glogau on the thoroughness of his treatment of the subject and the clearness of the presentation, but aside from the interest in the purely scientific issues, there was not much of importance and surely nothing that was new. Every general surgeon in New York has for years seen and operated many of these cases. The primary incision is the same and blunt disection is used in every case. The opening of the abscess with the forceps or with blunt scissors and, etc., was not new, but some important practical points had been brought out which might be emphasized. The first was that pus always takes the path of least resistance—an old axiom—and the surgeon should do the same; this was really the crux of the whole matter. These abscesses should be operated on immediately, without waiting to find out whether the infection is caused by the streptococcus, staphylococcus, or what not; they are septic foci and should be opened at once and drained thoroughly. The path of least resistance should be followed in opening them and the opening and the whole disection should be done with blunt instruments.

Dr. Dougherty said that he agreed thoroughly with Dr. Glogau that this operation is a necessary one, and that we are apt to slight the radical treatment needed in many cases. We fear such procedure and make a small incision in the throat and let it go at that, and that is where the general surgeons excel in judgment and in the treatment of such cases. In this way many laryngologists fall down and the cases go into the hands of the general surgeon, for few laryngologists are as capable of handling them as is the general surgeon.

DR. HURD said he had not heard Dr. Glogau mention what kind of anesthetic was used.

DR. GLOGAU stated that he used a general anesthetic.

DR. HURD responded that he thought, in the first place, the operation should be done under local anesthesia; and, secondly, that the doctor had described a rather radical operation, where the infection originated in the tonsil. An incision 3 inches long will usually suffice. Along the anterior border of the sterno-mastoid muscle and in front of the carotid sheath and under the angle of the jaw to about the level of the larynx, the pus will be found. After reaching the vessel sheath, dull desection with Mayo scissors.

He disagreed with Dr. Glogau in regard to trying to wall off the mediastinum in the presence of pus. Nature has a better chance if you leave the mediastinal area alone.

When to operate and where is another thing. Some of these cases occur in the connective tissue just external to constrictor muscle at the lateral wall, behind or below the tonsil. It is easier to reach such cases through the mouth than from the outside. A nick will get into them, and enlarging opening with finger they will drain. It is one of the hardest things in the world to tell when and which way to go, externally or internally. One must always bear in mind the danger of edema of the larynx, and the minute that begins to increase, go in and find the pus. It is not always an easy thing.

DR. EMIL MAYER asked whether local or general anesthesia was employed. The speaker said 38.88 Fahrenheit, did he mean that? (Dr. Glogau: Centigrade.)

Dr. Mayer said he was very much surprised not to hear anything about the Carel-Dakin fluid, which has worked so wonderfully in chronic mastoid operations, destroying pus bacilli in a very short time. It would also be well if Dr. Glogau, in going over the proofs of his paper, be explicit about the size of the glands. When one says a thing is "as big as an apple," you want to know whether it is from Oregon or another kind; and when one says "as big as a cocoanut," we don't know much about it. Size should be given approximately in figures.

As Dr. Dougherty had said, this external operative procedure has been done frequently. "The question is how to know when to go ahead." All have seen cases of peritonsillar abscess that were not the usual kind, the fulminating kind, and had anxious moments. These bear the most careful watching. The subject was a very timely one and very well studied.

DR. DOUGHERTY asked Dr. Glogau's opinion of those cases where he had to do a tracheotomy, whether the respiratory inhibition had been caused by the anesthetic or by injury to the nerve during operation.

DR. JOHN GUTMAN said it is not so much a question how to operate, but when to operate, and recited his own case of a man of about 50 years of age, who was suffering from a peritonsillar abscess, which he opened. Some pus was evacuated and the patient felt much relieved. The next day there was a slight rise of temperature, and the patient remained in bed. The following day there was some pain in breathing and swallowing. Examination of the larynx did not show any disease. On the fourth day after the opening of the peritonsillar abscess the patient died suddenly. The patient could have possibly been saved, if his case would have been properly diagnosed and attended.

DR. GUTMAN, in closing, does not claim originality for external opening of descending abscesses. General surgeons have performed similar operations, but the method was not worked out as a typical procedure. He simply claims to have brought system into the attempts. Dr. Freudenthal's case of a patient with a descending abscess that was not diagnosed correctly and died on account of spreading of the process without having the pus drained shows the necessity of a typical method of procedure in such cases that will enable us to save the patient's life.

He agreed with Dr. Hays that the infection spreads through the lymph ways. The glands, however, will, sooner or later, break down and the pus will involve the tissue interstices and will thus descend into the mediastinum.

Dr. Dougherty was right that the external operation is not a new method and that the surgeons got the best of the laryngologists, who, for a long time, had not the courage to perform this operation. Nowadays, however, the modern laryngologist masters the entire major surgery of the larynx and its adjoining spheres. A thorough study of the topographic anatomy of this region and painstaking work on the cadaver will enable every laryngologist to perform this operation just as easy as the opening of the sinuses and the exposure of the brain, which, not so many years ago, the rhinologist would not dare to do. The most important thing is to operate immediately when indicated, and not to wait till the patient is beyond hope.

Of course, local treatment should be tried first. But when the symptoms become serious, one should not wait. He reported two postmortem findings of most severe infection where the symptoms were only present from two to four days.

He would not dare to do what Dr. Hurd advised: to go from the peritonsillar incision deep down towards the vascular sheath. His studies on the cadaver, the reports of the literature and a number of observations of such complications taught him the danger of fatal hemorrhage that may follow an exploration in the dark.

One may open a peritonsillar abscess and even go slightly towards the depth in order to reach the pus. Dr. Hurd took a great chance in performing such an operation on a patient bound to travel, and his patient bled to death on the Twentieth Century train. The typical method, as described in this paper, is a safe and sane method; by exposing the affected area from the outside, such and many other complications will be avoided. The operation was not performed under local anesthesia. Choking in such cases is not due to pressure on the nerves or to ether, but to edema of the epiglottis, the aryepiglottic folds and the vocal cords. The manipulation around this region, together with the recumbent position, increase the shortness of breath.

He had distinctly mentioned that the external operation was not a new method and that he had only typified the same. He also advocated conservative treatment at the beginning. The patient must, however, be closely watched. When the progressing symptoms point to a severe infection and when the oozing of foul smelling pus from the throat points to bad drainage and when the deeper tissues of the neck seem to be involved, the typical operation ought to be performed immediately. It is not dangerous to open the mediastinum in the presence of pus. It is sealed against the pus, when healthy, and drained when diseased. In general surgery a healthy abdominal cavity is opened in the presence of a suppurating appendix, and rarely supparative peritonitis occurs therefrom.

The Value and Ultimate Fate of Bone and Cartilage Transplants in the Correction of Nasal Deformities. Dr. Wm. W. Carter.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. SHEEHAN: Mr. Chairman, This is a very admirable paper of Dr. Carter and I congratulate him, the able way which he has delivered his paper and demonstrated his cases. The question is, which of the two transplants should we use in giving permanent support in these cases of depressed noses. Now, take the case of a bone graft, if it is inserted into the loose tissue of the nose it will eventually absorb. If one expects the graft to live, bone must be united with bone, otherwise it surely will absorb. If bone and cartilage are used together with the bone in contact with bone at one end, it seems to me that the part which is joined to the cartilage will gradually break away, becomes thin and slowly atrophy.

I met in Paris this past summer the recognized leaders in plastic surgery of the world and this subject with many others was brought up. It was the unanimous opinion of these gentlemen that their results with bone was so disastrous they had given it up, and substituted chrondal cartilage, which gave them from 95 to 98 per cent successes. (Probably their technique with the use of bone was bad.) Now this is very interesting, as these men had charge of the plastic surgery during the war of the various states of which they were members. Take the American plastic surgeon, Staige Davis of Baltimore, who from clinical observation and experiments showed that bone grafts were very uncertain and did frequently absorb.

Suppose, for the sake of argument, we agree that bone has the same advantage as chrondal cartilage; that is, it does not absorb. But bone has so many other disadvantages. I am sure you will all agree with me, that in the certainty of growth of chrondal cartilage their can be

no comparison. During the past year or so I have used cartilage in 27 depressed noses; 26 of the cases were successful. In the unsuccessful case, part of the graft was lost through injection, the deformity resulting was so great I removed the whole graft under Novocain anesthesia and successfully reinserted another transplant which was hoarded beneath the skin of the chest.

The experimental work of Sir Arthur Keith of the British army in the use of chrondal cartilage is very interesting. Cartilage grafts were removed after periods varying from 1 to 3 years, with the result that not in one case was there any evidence either macroscopically or microscopically that the cartilage degenerated in any way. It would be very interesting if it were possible for Dr. Carter to study, say ten of his cases, in this way. In one of Dr. Carter's cases he said it was quite impossible to bring down the tip of the nose. I am quite sure if he performed the Gillies operation for the relief of depression of the nasal bridge, he would have success. This operation was described by me before this section some nine months ago. To perform this operation it would be quite impossible to use bone on account of the difficulty of angulating it.

Now what are the advantages in the use of cartilage? They are:

1. Cartilage will neither shrink nor enlarge.
2. The general opinion amongst plastic surgeons is that crondal cartilage is an ideal supporting substance for the nasal transplantation.
3. It will also live when in contact with bone at one end or both ends, although the union between will not be rigid.
4. Cartilage is flexible and thus less liable to subsequent fracture, as bone is.
5. It can be easily handled, shaped and whittled to any desired pattern, even handling the graft roughly does not reduce its vitality, as in bone.
6. If it becomes infected and treated in a proper surgical way the graft in most cases will be saved without materially damaging the transplant. This is not true with bone, it must be removed as a rule.
7. It is just as accessible to obtain as bone.
8. The perichondrium must be removed, as it will cause the graft to curl up, with it occupying its concavity.
9. Twice the amount of cartilage is taken as need be, the excess being refrigerated, so to speak, beneath the skin of the chest. This is done in the event the operation be not successful. Under local anesthesia, the graft can be removed and again reinserted in the nose. This is not true of bone, for if you insert it, in loose tissues it will gradually absorb.
10. It seems cartilage gives better cosmetic results.
11. Autolgous cartilage grafts never absorb if the graft successfully takes.
12. Cartilage should always be transplanted free.
13. Cartilage thoroughly keeps its shape, although held loosely by fibrous tissue.
14. Cartilage grafts may be exposed when taken from its host for hours. This is not so with bone; to continue viable it must be transplanted immediately.
15. No bandaging as a rule is necessary when using cartilage. In the case of the bone transplant, it is necessary to use a tight bandage from 7 to 10 days in order to keep the bone in situ.
16. If one uses cartilage as a transplant the airway is as a rule never clogged. In the case of bone the airway is clogged from two to four weeks.
17. If bone is used it makes a difficult job for one, as the reaction from subcutaneous undercutting is tremendous; the chiseling into the bone of the forehead is tedious, time consuming and one is liable to mutilate the periosteum, as it is no easy job to separate the periosteum in this area, when one is practically working in the dark.

18. It would seem that the advantages of cartilage over bone are so great it ought to be more generally considered, as it has proven to be a much better transplant.

Dr. Sheehan then inquired what Dr. Carter's method was in lining syphilitic noses.

DR. CARTER in closing the discussion said that he had stated tonight and had always maintained that bone, unless it was properly transplanted, would be absorbed. Dr. Sheehan had repeated and emphasized this point made in the paper, and Dr. Carter was glad to note that the doctor now agreed with him in regard to the permanency of bone transplants.

Bone is a complex tissue, slow in its metabolic processes, and time is a necessary element in judging its permanent value. Dr. Carter felt that his clinical cases and X-ray plates, taken so many years after operation, and shown to the Section tonight should be considered convincing proof of the permanency of bone transplants in the nose.

Bone shows far more vitality than cartilage and grows, whereas cartilage remains just as it is at the time of transplantation. Dr. Carter uses and has always used cartilage in his work, but he is careful to use it in the right place; namely, to replace cartilage that has been destroyed. Dr. Sheehan speaks of leaving a piece of cartilage lying around all day without its losing its value as a transplant. Dr. Carter did not admit that this could be done, but he asked why should a graft be removed until we are ready to place it in position. The rule should be; take it out when you are ready to use it, and don't waste any time in getting it back into the tissues in the place where you want it to remain.

Dr. Carter can see neither sense nor advantage in hoarding cartilage under the skin over the chest; it is just as easy to get it from the rib when you need it, and only the amount needed should be removed.

In regard to the reaction: When there is a good operation there is no reaction. It amounts to little more than making a clean incision into the skin.

There is no clogging of the nose after operation, since the introduction of his gold-wire, intranasal splints; the patient breathes through the nose as before, as all packing has been dispensed with.

Though all of the work is done through one small intranasal incision, Dr. Carter does not grope in the dark, but, knowing his instruments, operates, guided by the sense of touch, as accurately as under the guidance of the eye.

In syphilitic cases, Dr. Carter removes all the scar tissue possible and lines the nose with Thiersch grafts.

Contribution to the Diagnosis of Subacute and Chronic Inflammatory Lesions of the Mucosa, Lining the Maxillary Antrum of Highmore. Preliminary Report. Dr. Wm. Spielberg.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

SECTION ON OTOLOGY.

December 9, 1921.

A Typical External Operation for Abscesses Descending from the Upper Air Passages and the Base of the Tongue. Dr. Otto Glogau.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

DR. ALFRED BRAUN said the case was a very interesting one and was very thoroughly and carefully described. He wished to refer to only one point, namely, the indication for operation in meningitis of labyrinthine origin. The outcome, so far as the result of operation is concerned, differs considerably, depending upon whether the meningitis complicates acute or chronic labyrinthitis. He had not had a case of menignitis complicating chronic labyrinthitis. He had three cases of meningitis complicating acute labyrinthitis. Of these, two were operated upon, and the third was treated expectantly. All died. It does not seem to make much difference what one does in these cases. One of the cases was operated upon within twenty-four hours of the onset of the labyrinthine symptoms; in the second case, the labyrinthine symtoms did not come on for several days after the mastoid operation. The labyrinth operation was done within 48 hours of the onset of the labyrinthine symptoms. In the third case, nothing at all was done and the patient died in three days. In chronic labyrinthitis there is probably more chance of doing something effective, for the infection is not so fulminating, and if the case is seen fairly early, before meningitis has become diffuse, operation may be of benefit.

DR. ALFRED KAHN said that the paper interested him exceedingly, especially the histo-pathology, which he thought was worked out very much in detail. He was, however, disappointed in that the clinical aspects of the subject were not so well covered. In the last analysis practitioners were looking for practical results. How can all of this information be used practically? For example, how does it effect our judgment as to when or when not to go in and do a labyrinth operation? The mortality following a labyrinth operation is exceedingly high. Many cases that would seem to be operable recover without operation. We have no definite symptom or symptoms which definitely indicates operation or non-operation. A case presents itself with meningitis, a dead labyrinth, and following ear disease. No operation is done and the patient recovers. The same case presents itself, the labyrinth is operated and the patient recovers. The case presents itself again, no operation is done and the patient dies; the same case presents and is operated with the same result: he dies. It is an equal throw. Clinically, we are not in a position to know when to operate or when not to operate.

Fistula in the semi-circular canal. The presence of a fistula is indicative that the lesion is usually of long standing. It is conceivable, of course, that an acute lesion might eat into and through the semicircular, but it must undoubtedly be a rare state of affairs. It takes an element of time for an infection to digest the hard ivory-like semicircular tissue.

As to spinal puncture. As to the statement that a spinal puncture should be made before operation. This, of course, was not a new suggestion; however, I am not sure that the speaker intended it as being new. We have been doing a preliminary spinal puncture for years. This, as a matter of routine, before radicals or brain operations. It is well to know the condition of the spinal fluid before an operation. You are then in a position to determine any changes that may have resulted as the result of the operation.

Dr. Glogau had laid much stress on the fact of the blackish brownish discoloration. It was an important point to find it in this case, but it

seemed doubtful whether in a series of cases this symptom would be found. In the cases related, the labyrinthine symptoms came on very rapidly. It would seem only common sense that when you have a blackish discoloration it would be indicative of an infection of long standing; or it may have been due to the fact that there was some peculiar form of bacteria which may have caused the particular discoloration. The possibility of finding this symptom in a number of cases seemed doubtful.

Meningitis following labyrinth. How should we proceed? We have no hard and fast symptom to tell us when to operate (when to do a labyrinth and decompression operation). Dr. Kahn said that in his opinion labyrinth cases should be treated very conservatively at the start; but that when from any course or train of events an operation was decided upon the most radical operation should be decided. The mere opening of semi-circular canals and the first and second turns of the cochlea will not drain pus or inflammatory products from an extensively involved area in the neighborhood of the internal auditory. Nor what is the use trying to do a decompression from behind when the infected area at the internal auditory is not touched and when there is a pyramid of bone standing in the path of drainage. He believed even though the facial nerve was cut through that drainage could only be made possible only through the exenteration of the entire area extending from the lateral sinus behind to the anterior wall of the middle ear in front. This would thoroughly drain the parts and give a wide area for decompression, and that even though the facial was destroyed, there would be a much greater chance to save life. It would be better to have a paralyzed facial than a dead patient.

Dr. Glogau responded that the discussion was about those cases that did not yet show meningitis, and the question was when to operate a labyrinthine suppuration in order to prevent meningitis; and he had pointed out that sooner or later suppurative meningitis would occur in cases where the outer labyrinthine wall showed the described symptom of blackish-brown discoloration. We should base the indication not only upon the clinical picture, but also upon the underlying histopathologic condition. He said he did not believe the radical operation mentioned by Dr. Kahn was called for. The Neumann operation removes as much as necessary of the labyrinth and exposes the dura sufficiently, and at the same time preserves the facial nerve. If a patient should survive the operation proposed by Dr. Kahn he would be very unhappy because of the disfiguration entailed.

Report of Two Cases of Head Injury, With Abnormal Oto-Neurological Findings. Mark J. Gottlieb.

(To be published in a subsequent issue of THE LARYNGOSCOPE.*)*

DISCUSSION.

Dr. Glogau asked if an X-ray was taken to see if there was a fracture at the base of the skull.

Dr. Gottlieb replied that he did not see the patient when he was first injured, and no X-ray plate was taken when he did see him.

Blood Tranfusion in Otological Conditions, With Moving Picture Demonstration. Lester J. Unger, M.D.

DISCUSSION.

Dr. Richard Lewisohn remarked that the hour was late and he would be very brief. Dr. Unger had referred to the question of uncitrated versus citrated blood. The selection of the proper method of blood transfusion is of great importance. The Unger apparatus, which connects donor and recipient, is strictly contra-indicated in cases of sepsis, typhoid fever, etc., since it is possible to carry the infection from the recipient to the donor. In these cases either the citrate method or the Kimpton-Brown method (parafinized-glass-cylinders) are the methods of choice.

(To be continued)